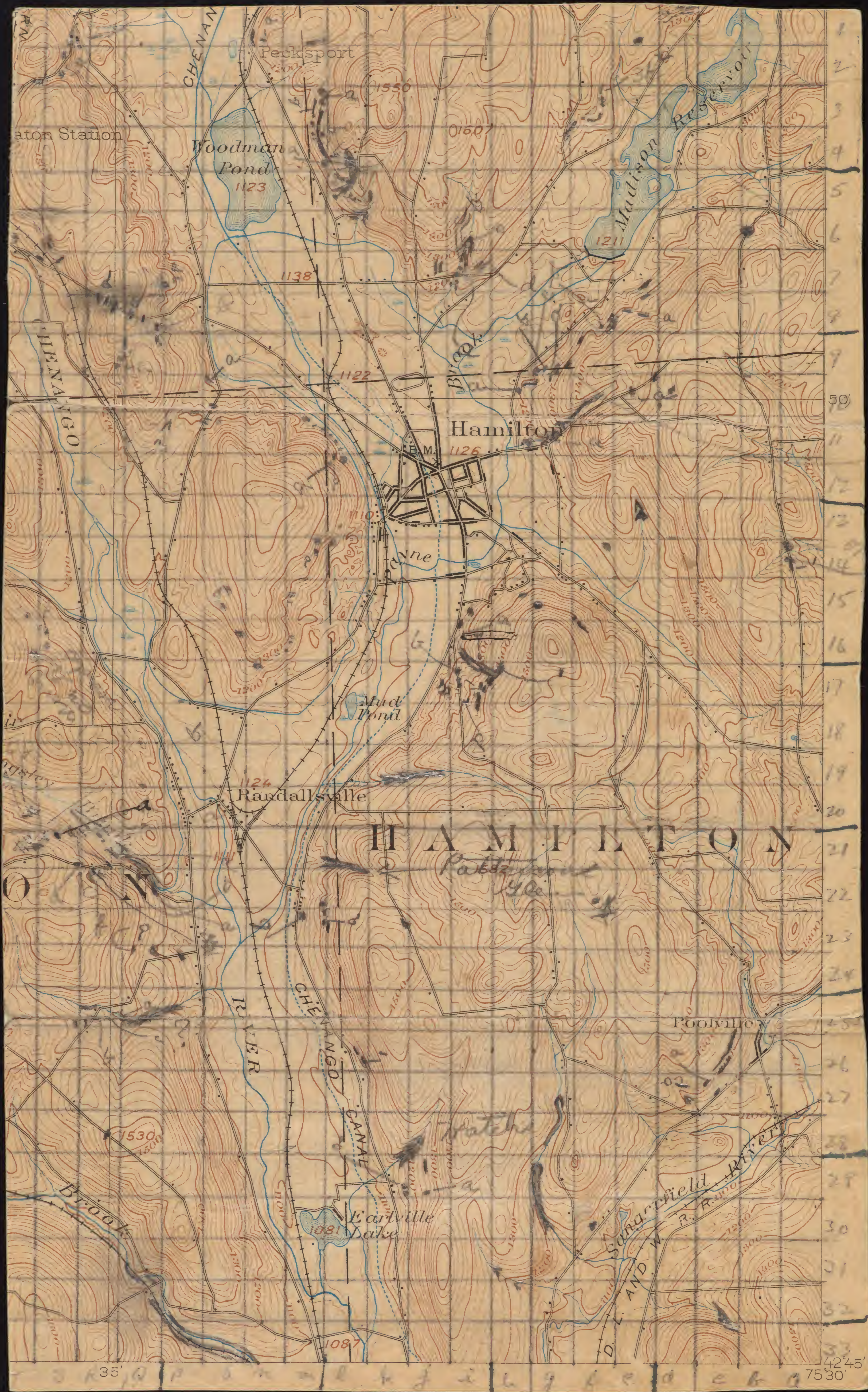


Morrisville Quad.



At Ashantee under the first dam
was seen the Onondaga, ~~after~~ just
across the short wall across the dam
at the pond and at the bend a few
patches of fine, black shale were
seen which yielded

O. minuta *L. hintans*
Leptæna sp.

These are at 580'

At the point marked a on the map
there are shales that are light grey
and quite calcareous, giving a fresh
appearance. These are probably on
the 600 contour mark. The contouring
must be wrong here. The stone is brownish
grey in section. Fossils are *P. ligatus*,
P. pedus.

Section at 2nd dam
Ashantee

The Marcellus shale
just below the Stafford
is crowded with *L. hintans*.
The Marcellus here is a
fine, black shale
with about 3" calcareous
shale below the Stafford
sh. The calcareous sh.
were found *P. lineatus*,
L. truncata, *L. hintans*.

38'

concliff

Stafford is
at 580' just
the dam

The Stafford on the
surface is chocolate
colored but when
fractured is grey.
It is about 18" thick.
On the surface it

III Stafford is 16" (with 3") slowly below
31 Marcellus
stream

is crowded with
O. truncata numerous. The
shale for 8 or 9" in the Stafford
is calcareous, has a concretionary
texture and is light grey.

1a



Blafford

a

Above this the shale is fissile breaking into paper thin flakes. It is crowded with *L. limitare*, *C. nummulus*, small *Schuchertella*, etc.

It is, from the top of the Stafford to the top of the decayed bridge over the creek 38' and this interval is occupied by shales.

August 19.

Bear Mountain Ravine

433 paces from the highway bridge the first rock is encountered. It is a soft dark grey shale that is faintly silty. It crumbles, it gives no effervescence with acid. Occasional small rounded or flattened concretions may be noted. For the first 15' the shales are not very fossiliferous only an occasional *P. discoideum*, *Leiorhynchus* or *S. truncata* being found. But at 15' vertical (3 hand-level steps - 1) *Leiorhynchus* is very abundant and appears to me to be *L. laura*.

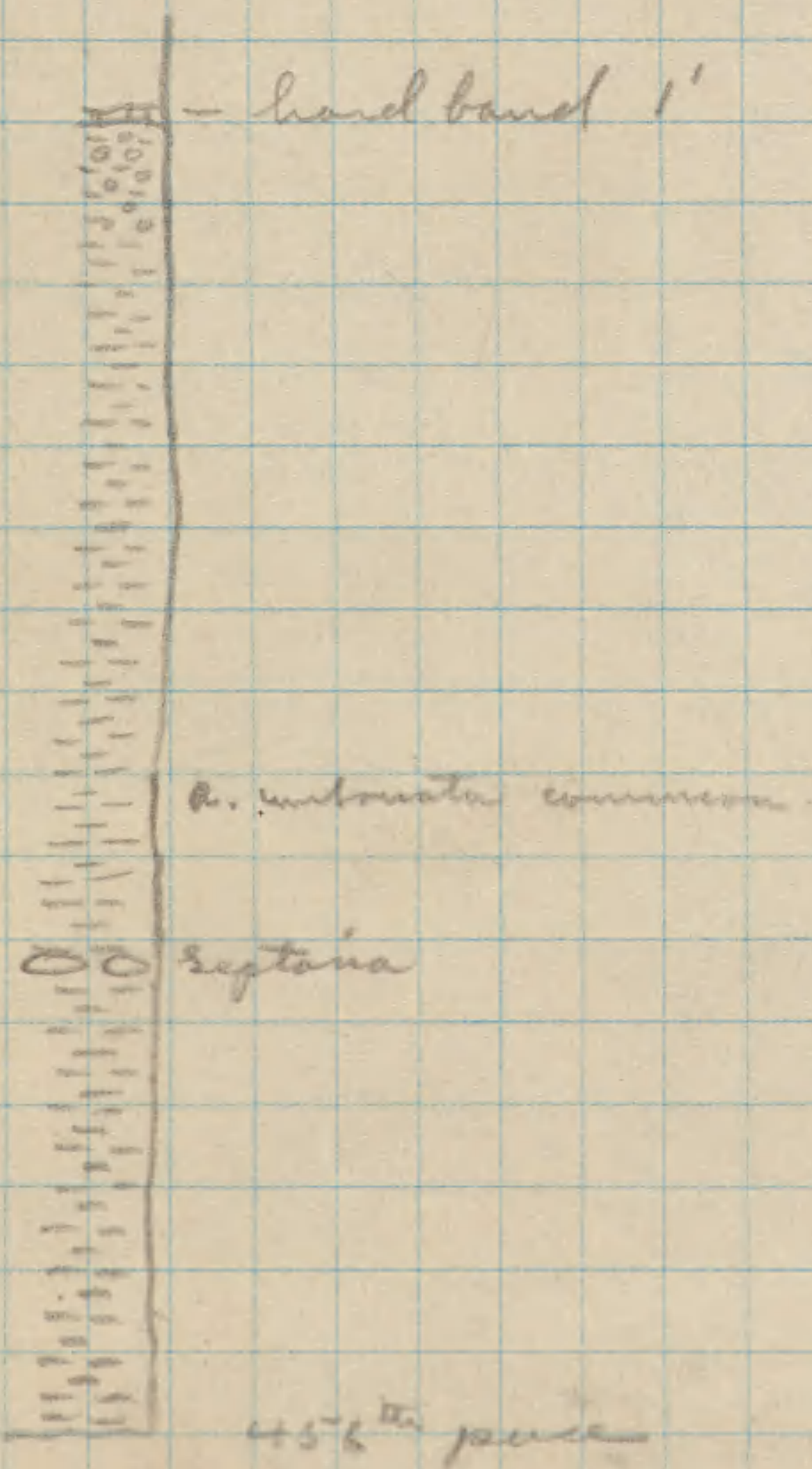
3505 Between 20-20 + 25-25 only *Leiorhynchus* was noted as an abundant fossil, but the living chambers of an *Orthis* was also seen. Also *A. umbonata*.

Between 25-25 + 30-30 - *L. limitaris*, *L. laura*, *S. eretrum*, *A. umbonata*.

About 30' up was seen a large concretion, circular and about $1\frac{1}{2}$ ' in diameter. It was of hard blue-grey ls and contained *L. limitaris*, a septarian at the level about 2' in diameter.

35 35-40-40 - *N. trigonatus*, *M. subumbonatus*, *L. laura*, *Orthis*, *A. umbonata*, *C. limitaris*, *C. unguiculatus*, *Pal. constricta*, *N. trigonatus*, Crinoid stems, *P. discoideum*.

These very fossiliferous shales with rather well preserved *Ambocoelia* come in high in the 8th step. New forms are seen here for the first time and this is probably the transition point from the Cardiff to the Shinarump.



Each square 5'5"

A rock fall from above about 30' showed the following forms. This occurred in the 5'5" interval off the ninth step.

Large Ambocoelias, *T. carinatus*, *N. concinna*, *S. antortriatus*, *S. perplema*, *S. granulosa*. These probably belong to the third band.

Between 40-40 and 50-50 the rocks are not as fossiliferous as those noted near the top of 40-40 (that is around 42') and the only additional form was a *Loxonema* with a concretion forming about it. *Leiorhynchus* in this interval is large and not abundant.

Between 50-50 and 60-60 The shales are considerably coarser but *L. laura* was noted. They are also lighter and break into chunky pieces. The rock here also contains many small round concretions, some almost perfectly spherical.

The following fossils were observed in a rather softer shale Between 60-60 and 65-65.

N. oblongatus
Panurella sp.
P. fragilis
N. triquetra
L. laura
P. discoidum

N. corbuliformis
Orthoceras sp.
M. pygmaea
A. umbonata
G. capillaria

Fauna between 65-65 to 75-75

Grammysia sp.
A snail
✓ *L. laura* - very large cc
P. fragilis
✓ *Atthis* sp.
N. triquetra

A. umbonata cc
✓ *Hadrophyllum*
✓ *C. multostriatus* c
✓ *P. discoidum*
Baculites
G. subulatum

The rocks in this interval have become at the top of it somewhat coarser and are very fossiliferous. They are also marked by *Taonurus*.

The fossils are rather well preserved and the Ambocoelias especially can be taken entire. Notable is the small coral referred to *Hadrophylloids* and the very small *Atthyrid*. Some of the concretions contain *P. discordium* but others are masses of *L. limitaris* or *L. laura* in beautifully preserved forms.

The shale between 75-75 and 80-80 is quite sandy and contains a great many small calcareous concretions. The fauna here is as follows.

- | | |
|----------------------------------------|-----------------------------|
| <i>Lox. hamiltoniae</i> | ✓ <i>S. arctostriatus</i> c |
| ✓ <i>S. perplanus</i> | <i>Orthoceras</i> sp. |
| ✓ <i>A. spiriferoides</i> | ✓ <i>C. scitulus</i> |
| ✓ <i>L. laura</i> c | <i>N. triquetra</i> |
| <i>N. oblongatus</i> | <i>Chaetetes</i> |
| ✓ <i>C. mucronatus</i> | <i>Orbiculoides</i> |
| ✓ <i>C. setigenus</i> | <i>P. iowensis</i> ? |
| <i>M. pygmaea</i> | <i>Ambocoelia</i> sp. |
| ✓ <i>Spirifer</i> cf <i>granulosus</i> | |

The Ambocoelias here I cannot place as they are very large. They may be *praecumbens*.

The ls. is about a foot thick and lies 86' above the 458th piece. It is a compact ls. of a grey color semi-*xl* from *crinoid* remains. It is very hard and resistant to the hammer. Fossils noted in it are:—

- | | |
|-------------------------------|---------------------|
| <i>A. princeps</i> | <i>C. coronatus</i> |
| <i>Cyathophylloids</i> corals | <i>Spirifer</i> |
| <i>T. carinatus</i> | <i>C. boathi</i> |
| <i>Platyceras</i> sp | |
| <i>C. mucronatus</i> | |

In places the band has considerable shale in it.

The shale for 2' on the hard band is mostly soft but contains some masses of ls. In this shale a short distance from the falls, the following species were recorded:-

- | | |
|--------------------------|---------------------------|
| ✓ <i>S. perplana</i> | ✓ <i>A. umbonata</i> |
| ✓ <i>C. mucronatus</i> | ✓ <i>N. oblongatus</i> |
| ✓ <i>J. cuneatus</i> | ✓ <i>C. indenta</i> |
| ✓ <i>N. concinna</i> | ✓ <i>P. iowensis</i> |
| <i>Sphenotus</i> sp. | <i>C. setigera</i> |
| ✓ <i>Pal. constricta</i> | ✓ <i>Lox. hamiltoniae</i> |
| ✓ <i>M. subalata</i> ? | <i>Goniophora</i> sp. |
| ✓ <i>M. concentrica</i> | ✓ <i>P. cylindrica</i> |
| ✓ <i>C. dotis</i> | ✓ <i>C. bellistriata</i> |
| ✓ <i>S. audaculus</i> | ✓ <i>Pal. plana</i> |
| ✓ <i>P. radiata</i> | <i>Productella</i> sp. |
| ✓ <i>D. sculptilis</i> | <i>Grammysia</i> sp. |
| ✓ <i>L. rostellata</i> | ✓ <i>C. scitellus</i> |

5' 5" above the hard band is a 3' cascade and the following fauna was recorded from the rocks here

- | | |
|-------------------------|-------------------------|
| ✓ Large cup corals. | <i>Lox. delphinea</i> |
| ✓ <i>R. warraxeni</i> | <i>Perna</i> |
| ✓ <i>S. audaculus</i> | ✓ <i>A. umbonata</i> |
| <i>Platyceras</i> sp. | ✓ <i>C. mucronatus</i> |
| <i>Pterinospecter</i> | ✓ <i>C. indenta</i> |
| ✓ <i>E. lucina</i> | ✓ <i>S. perplana</i> |
| <i>C. boothi</i> | ✓ <i>Favosites</i> |
| ✓ <i>N. concinna</i> | ✓ <i>S. audaculus</i> |
| ✓ <i>J. cuneatus</i> | ✓ <i>A. decussata</i> |
| ✓ <i>M. concentrica</i> | ✓ <i>S. granulosa</i> ? |
| <i>C. elongata</i> | <i>Pal. hamiltoniae</i> |

5' 5" - 10' 10" above cascade the shales are soft, have concretions and numerous fossils like those listed above.

N. concinna is present, also *Pholidops* ^{ham}
P. rana and *A. umbonata*. At this falls there was a bank of shale of the kind at this level over 750' high

Fossils become continuously less abundant as progress is made above the hard band. *A. cuneata* was most abundant for several steps. At about 25' above the hard band a cephalon of *H. dehayi* was found. Between 35-35 + 40-40 above the hard band the following were found:

<i>B. sulcomarginata</i>	<i>P. rana</i>
<i>Ceratopora</i>	✓ <i>M. subolata</i>
<i>Pal. concentrica</i>	
✓ <i>S. arctostriatus</i>	
✓ <i>A. spiniferoides</i>	

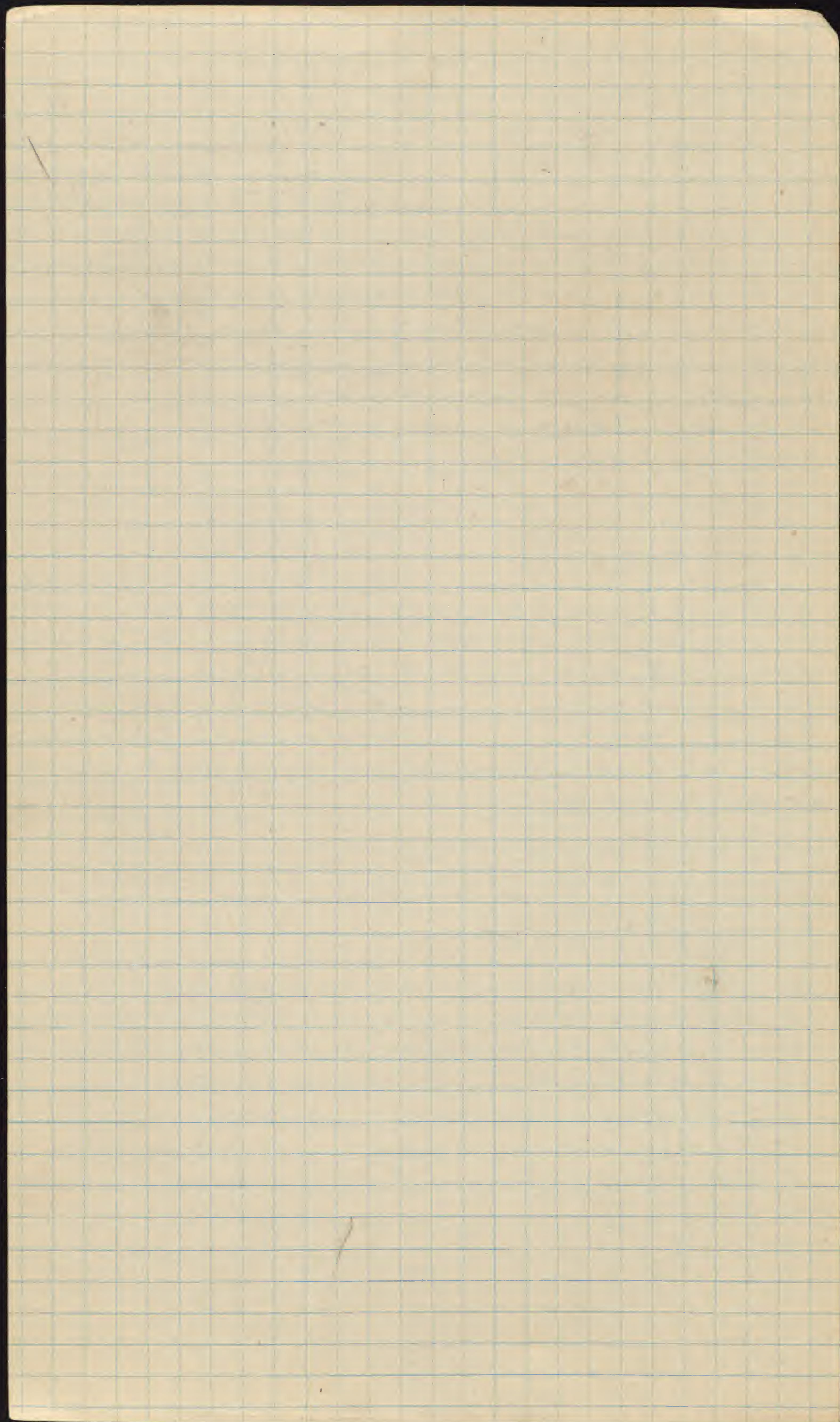
None of these is abundant.

Between 40-40 and 55'-55' a few of *Bembexis* and *P. discoidium* were found. The shale at 50' above the hard band is a soft blue grey non-calcareous shale with little or no grit. Small clumps of *Ceratopora* were occasionally noted. Concretions have been numerous in the 60' of shale traversed from the hard band and they are of all shapes.

Just below the falls between 55'-55" + 60'-60" were found in a dark shale:-

<i>Orthoceras</i> sp.	✓ <i>M. oblongatus</i>
✓ <i>L. laura</i>	<i>B. lida</i>
✓ <i>M. triquetra</i>	✓ <i>P. spinulicosta</i>
✓ <i>S. pectinatus</i>	

The top of the falls is at 80-80 and is caused by a concentration of *Ceratopora* in the shales. *B. sulcomarginata* and *Pal. emarginata* were found here also *P. flabellum*. The reefs were in three or 4 layers and almost made up the mass of the rock.



At 100-100 - *M. pygmaea*, *S. laura*, *S. nuntia*,
S. crotalum, *P. fragilis*, *Parenka* sp.,
P. discoidium, *N. oblongatus*, *N. triquetus*,
Grammysia 2 sp.

From 100'-100" - 165'-165" a considerable fall
prevents collecting. At 165'-165" were found
E. itys, *N. randalli*, *E. regulata*,
large *S. spinifer*, *M. subalata*, *C. scitulus*,
P. discoidium. The shale here is dark
grey and rather gritty, weathering to a
light grey. At 170'-170" *C. scitulus* is very
abundant. Other fossils are *N. triquetus*,
Leiopteria sp. The shales here were very
hard.

At 190'-190" the shales are dark and
rather hard. Fossils noted here
are *N. oblongatus*, *C.*, *A. umbonata*,
S. truncata, *B. sulcomarginata*,
P. discoidium, *N. bellistriata*, *P. fragilis*,
N. triquetus.

Fossils at 195' are -

M. mytiloides
Leiopteria sp.
P. discoidium c
N. randalli
L. macroptera

C. setigerus
Pal. concentrica
B. sulcomarginata
Parenka Sp.
Nepluticeras sp.
M. pygmaea

Between 210'-210" and 215'-215" in a dark
shale the following were seen.

L. densa
N. bellistriata
S. perplena
C. marginatus c
C. scitulus
L. pennatus
C. boothi
M. concentrica
N. concinna c
S. andaculus
P. flabellum
P. rana

N. oblongatus c
N. arguta
C. bellistriata
A. spiniferoides c
C. induta
Orthoceras sp.
M. subalata
M. pygmaea
P. dilata
Lox. humilioris
S. truncata
M. mytiloides

At 210' is a row of concretions and calcareous matter with many *N. arguta*. The rock here is also filled with *C. scitulus* and large *Spinifers*, *B. sulcomarginata*, *Leiopteria*, *Schuchertella*, This concretionary layer forms a cascade.

Above the concretionary layer the shale is finer, also concretionary & in addition to the fossils listed on the previous page has *R. vanuxemi* & *S. mentum*.

The shales at 225'-225" have many concretions and in places septaria. Small bands or lenses of ls. are composed of poorly preserved fossils, otherwise the shale is dark blue grey and slightly gritty.

S. pernatus, *C. setigerus*, & *C. concretionis* were noted here. Pyrite is present in small concretions.

About 250'-260' above the hard band the shale becomes quite soft & fissile. A mass of ls. at 240'-240" has *S. perplan*, *C. scitulus*, *R. vanuxemi*, *Palaeoneilo* sp., *Orthis* sp.

The shales at 250'-250" are very thin bedded, calcareous and sandy. They are quite unfossiliferous and do not appear to have any fossils. At 275'-275" is the top of the falls. Thick beds of shale (or thin ss?) are interbedded with thin bands of calcareous ss or ls. One of these calcareous ss. bands was 1 1/2" - 2" thick.

At 295'-295" these shales tower up about 50'. Large numbers of boulders with corals and many ^{large} corals are also found at this level.

$$\begin{array}{r} 235 \\ 19 \\ \hline 254 \end{array}$$

The shales at 305' ^{305'} are soft and blue gray breaking into small chips. 4 segments from above had *L. luma*. At about 325'-325" they were exposed for 20 or more feet.

Remarks on the Bear Mtn. Ravine

Hand levelling in this ravine was not very successful as indicated by the discrepancy of my measurement with Luther's. The level is apparently good only for short sights. Where fossils of kinds not seen in the Cardiff become abundant is the dividing line between that formation and the Skaneateles. Luther draws his line at 20' below the hard band. It seemed to me that this came about still lower down. The shale for 2 or three feet below the hard band contained many fossils and that above it for ten or 15' feet also. It seems to me that the hard band with the accompanying shales are a distinct zone. Fossils become less and less abundant for a considerable distance above this zone. Throughout the remainder of the section typical Skaneateles fossils alternate with new-comers in various layers. The *Syringopora* reefs forming falls were interesting. Another interesting layer is the concretionary layer with accompanying shales about 230' above the hard band. This layer had many *C. scitulus* and in the concretions *N. alga* was very abundant. The shales above had fossils like the

New Gym fossils but probably ¹¹ do not belong there ¹¹. The upper layers were soft shales but intervening between the soft shales and the Nyassa zone came the thin-bedded siliceous arenaceous shales.

I traversed the creek up to the upper highway and this was about 360' above the hard band and soft shale was still exposed for about 20' just below the dilapidated bridge. I continued on for about $\frac{1}{2}$ mile upstream but found only glacial material which is very thick here. However for the whole distance, until the ravine was abandoned I noted blocks, slabs, and boulders filled with horn corals so as to make a "coral conglomerate". This showed the source of the corals to be beyond the road, namely west. I left the ravine between the first and second highway crossings. I believe the Ludlowville & Llanestres contact should cross the stream between the two highways. ^{Wrong}

As to the levelling: - A total of 460' by the contours occur between the ^{1st} upper road and the lowest exposed rock. I gave up hand levelling at 330-335 which brought me just to the road. Thus 357 $\frac{1}{2}$ existed between the hard band and the highway bridge. Add to this 87' to the top of hard band and the total is 444' for the distance traversed in the ravine. This is only 16' difference in 460.

Sept. 9.

Bear Mtn Ravine

Hand-leaving and collecting from top of high falls. As I recall, but the bottom of this 65' falls (the one I could not scale) *L. laura* and *M. subulata* were found.

On the top of the falls was seen *L. laura*, *M. subulata*, *C. scintulus*, *S. arctostriatus*, *B. leda*, *P. sectifrons*, *H. aelis*, *Oviculopora*, *C. minoratus*, *O. parvulus*, *N. oblongatus*, *N. trigonatus*, *S. crocatus*, *A. boydii*, *M. pygmaea*, *N. bellectriata*, *Grammysia carinata*, *P. patulus*, *P. discoidium*, *B. granulatus*, *Z. submarginata*, *Cystolites* sp., *M. mytiloides*, *A. decussata*, *S. minutum*, *O. undulata*, *Panurella* sp.

The rock here strongly resembles that at the lower part of the West Gym. concretions are numerous about 8' above the top of the falls. They are like those seen in the West Gym. The fossils are like those in the stream debris of Pratt Falls.

3 hand-level steps above "high falls" the shale is somewhat sandier and *Spirifers* are very abundant. Here was also seen *S. bisulcata*, *S. crocatus*, *N. oblongatus*. The rock forms a ledge. *P. discoidium*.

21' above *C. scintulus*, *P. discoidium*

About 21 or 22' above the high falls there are some rather coarse sands but only in a thin bed which is probably not continuous. Between here and 27' the shales have very few fossils *N. bellistriata* being the only one seen and they are ophiletic at 27' having very little gut in their makeup.

Between 8 & 9 steps comes the top of the first falls above the high falls. Here the rock is becoming coarser and more fossils are coming in. They are not abundant but the following were recorded.

Nucula - common

Scammisia sp.

Snails common.

N. oblongata

M. mytiloides

This assemblage is similar to those found in the shales & coarser stones between the top of the Kent Isym & the Fertilis block farm horizon.

Between 9 & 11 the shales become sandier. *Leiopteria*s are seen and a few *Nyssas* and *Macrochilus*. ~~Also~~ *Leiopteria*s become increasingly abundant and many of them contain *Nyssas*, *Leiopteria*s. The shales containing the concretion are also very fossiliferous and a good list may be seen on map.

other notes on this ravine.
A. spiniferoides is common in the
 shales. Also in the shales: -

Pal. concentrica

C. boottii

C. bellistruata

C. mucronatus

Ogthoceras sp

P. rana

P. lirata

M. subolata

U. arguta

P. patulus

B. llyra

H. lirata

The concretions in the layer at
 60' above the high falls abound
 in Nyassas. About 12' above stream
 bed and just below the concretions
 a layer with *C. mucronatus*, large
Spinifers, *C. scitulus*

P. flabellum was noted in this
 layer

The concretions are a blue grey ls
 very hard & very pyritiferous

This Nyassa band was seen
 1000 paces downstream from the
 highway bridge.

At 12 the concretions are common
 & at 13 a distinct line of them can
 be seen

Down the stream at the bend
 between 12 & 13 the concretions form
 a small cascade. The shale
 about them is calcareous and
 nodular. It contains *P. flabellum*

Platyceras and many bryozoa
 The concretions are irregular in
 shape.

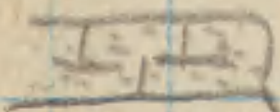
Between 14 + 15 in the soft shales were seen nests of *A. umbonata* with *P. rana* and *A. spiriferoides*.

At 16 there are shell ls. lenses in the dark fissile shales and above these the shale is dark and fissile and continues up for many feet. This is probably where the *Stenoterebra* ends. *S. pennatus* + *R. vanuxemi* are common in these lenses. *Myasaa* ranges at least as far as 15 1/2 steps or about 82' from top of falls.

Between 18 + 19 fissile shales + ss. The concretions + flat ls. lenses went under between 16 + 17. The shale is soft + fissile and has thin ss lenses, but above flaggy ss layers, thin, come in.

Between 23 + 24 shaly layers of ss come in, divided by layers of soft shale almost fissile.

The bridge is at 32 steps above the high falls.

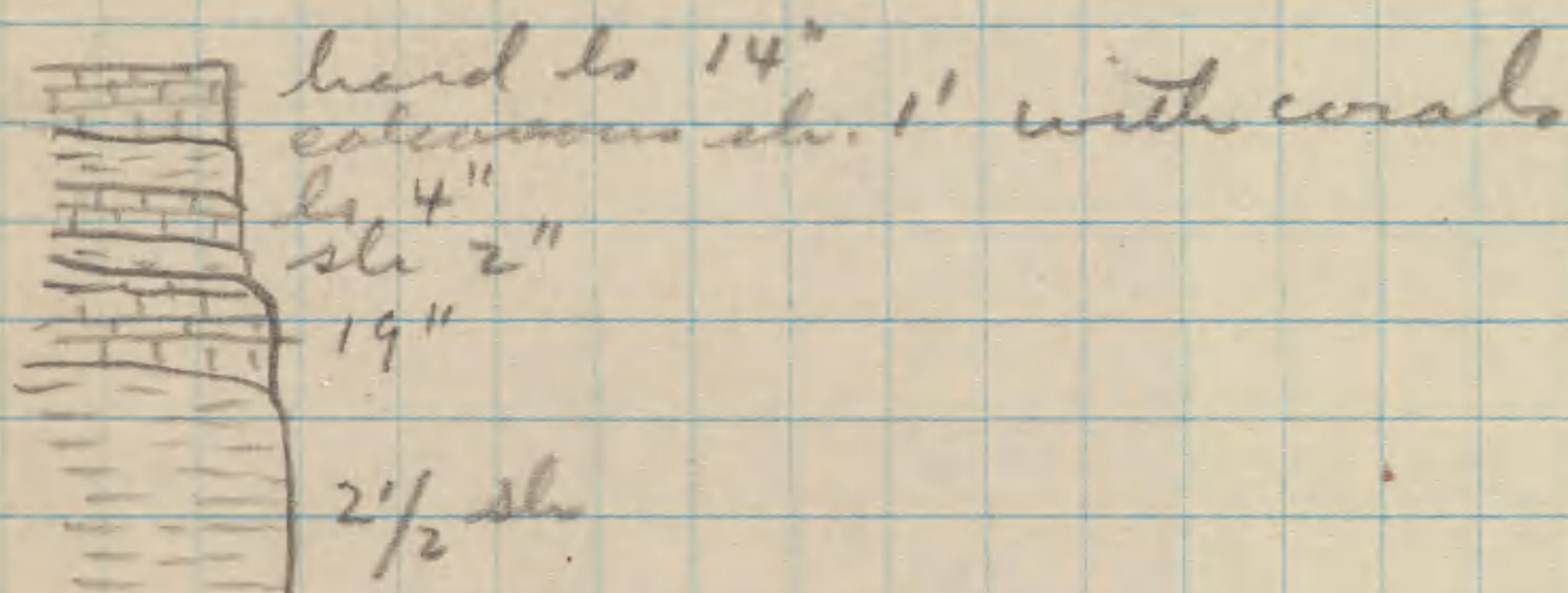


Winter 16'

1250 Road intersection

Centerfield ls. at Blossom

On the soft shale is a ls.



Fauna.

Atrypa reticularis 19" up

Lichenaria

C. boothi var *collitiles*

C. boothi

P. rana

P. rowensis

A. decussata

Capathophylloid corals

Heliophyllum

Favosites heads

Camerozoechia common about 1' up.

D. lineatum

S. demissa in corals

On the shale are 19" of ls. that break readily under the hammer and crumble to large fragments naturally. These have *Camerozoechia*, bryozoa, *Atrypa*, *Cyphocrinus*, *Phacops*, but no corals. *R. vanuxemi*. The *Atrypas* are very small. *P. rowensis*, *S. conspersa*, large *Ectopoda* *E. lucina*?

In the coral bed was noted a large Pelecypod that may be a princeps or *L. macroptera* fauna of the sh.

Coral, cup + compound

S. demissa

P. rana

A. decussata

A. spiriferoides

This ls. may represent a thickened equivalent of that found on the Lake Shore with *P. iowensis*, altho the fauna is greatly changed. This however may not be so. The examination of this locality took place just before dusk Monday evening and was therefore not thorough. It should be revisited

Blossom Revisited

About $2\frac{1}{2}'$ of softish shale, dark grey in color with a concretionary structure and few fossils. Fauna

A. umbonata

C. lepidus

L. fissurella

P. fragilis

are all found in the lowermost beds, but the shales become harder (more calcareous) *C. mucronatus* and *A. umbonata*? being abundant. In this $2\frac{1}{2}'$ of shale are 18" of ls. that splits easily into slabs. This contains many fossils.

A. cup coral

S. demissa

P. rana

C. boethi

Atrypa reticularis

S. pennatus (?)

L. laura ?

P. iowensis

Lichenolia sp.

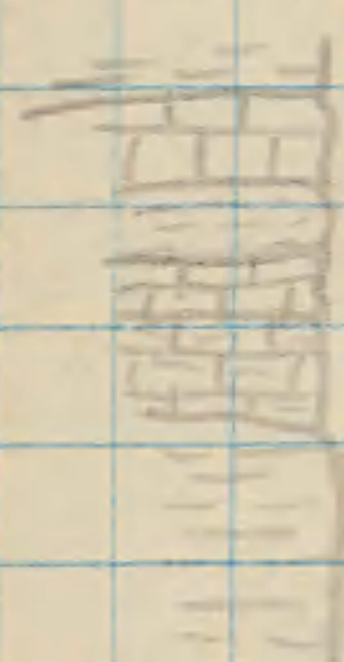
Nodular bryozoa

Conarotoceras

S. cornu

E. lucina (large)

Platyceras sp.



17-18" ls

10" sh

8" ls

18"

2 1/2' soft sh

Then follows an 8" ls bed hard and grey. It has:-

O. cloria

Cup corals

1"

The 10" shale with many cup corals & a large head of *Favosites*

Then follow 17-18" of hard variable ls. in places it is exceedingly hard & flinty, in others shaley.

Section below dam at Blossom
6' of rock exposed - lower 2 1/2' belongs
to the Stearns shales which here is like
a soft dark grey shale weathering
to small fragments. It has *S. pennatus*
A. umbonata, *C. mucronatus*. It is
somewhat calcareous.

1927

July 23.

Bowen Brook

Ludlowville

10-15' of the upper beds, not very well displayed, usually in the stream bed where the shale is greatly disintegrated. About 400 or 500 paces downstream from the bridge is a rather good exposure in a vertical cliff of 8-10'. Fossils found in this upper shale are:-

A. spiniferoides cc

S. pennatus

T. carinatus

Small cup corals.

Tichenor

Not well shown, but about 100-150 paces downstream the contact with the Lud- is seen. Here there are 15" of hard grey ls in which the fossils stand out in relief. A somewhat shaley ls must be present below this 15" band, that contains corals and byozoa, to judge from the fragments lying about and from the large *Heliophyllum* cup-corals. None of this stone was seen in place. Fossils observed in this band are:-

C. subcaespitosum

Cyathophyllum

Huge crinoid stems

Gerracocrinus plate?

D. lineatum

P. rana

R. penelope

Large *Spinifers*

C. coronatus

many Byozoa

On this layer is another 15" thick somewhat shaly in places but a good half of it is rather hard ls. Fossils were not seen in this stone in great abundance but *A. spiriferoides*, *Camarotoechia*, *D. lineatum*, *P. rana* and *S. pennatus* were seen. The exact thickness of this could not be measured. 30 paces up stream from the highway bridge considerable shale comes on the ls and it is thought that here the Moscow begins.

Moscow

37 paces from the highway bridge this shale becomes about 9" \pm 1' in thickness and is quite fossiliferous. This shale has the same appearance as that on the Cincinnati stone at Red Gate. It is a rather soft shale crowded with well preserved crinoid stems and more poorly preserved fossils. The shale itself is very slightly calcareous. In it also are lenses of small size and irregular masses of hard crinoidal ls. The fauna observed there follows:-

S. perplana r.

C. indenta re

A. decussata c

Lingula sp. r

R. fimbriata re

C. vicinus re

S. perversa r

D. lineatum r

C. coronatus

S. pennatus

C. setigerus

I. exigua

R. pelelope ?

E. lucina (var *perforata* ?)

P. rana

Productella sp.

C. bellistriata

S. macronotus ?

Ambocoelia

Cran. hamiltoniae

S. inaequistriata

Between 45 + 90 paces there are no rocks exposed. At 90 paces the shales are soft and argillaceous. In a layer here with many crinoid stems were found: -

S. pennatus
S. andaculus
D. sculptilis
R. varnuxeni
C. indenta
Leiopteria sp.
Actinopteria decussata
Platyceras
S. inaequistriata
Aviculapecten sp.

M. concentrica
J. exigua
Bryozoa
P. carinatus
Cryptonellas (crushed)
Trachypora limbata
P. undosus
L. orbiculatus ?

100 paces

From 117-135 paces no rock but at 135 paces about 20" of rock are exposed. Here in a layer with much crinoid material was found large *Actinopteria*s with a height of $3\frac{1}{2}$ "

S. andaculus
R. penelope
Schuchertella sp. ?
A. spiniferoides
M. concentrica
D. lineatum

R. varnuxeni

The fossils appear to be localized in these patches for the shales appear quite infossiliferous

At 221 paces there are about 50 ft of shales exposed horizontally. These have a blocky character and are somewhat calcareous; they may be a leached calcareous band. A large glabella of *Phacops* was found here.

At 400 paces upstream a 20' bank exposes the Moscow but collecting is not possible in it as it is greatly covered by dirt. At this point in the stream debris a *Plumodictyum* was found.

At 450 paces in the bank in a concretion the following were observed:-

<i>A. spiniferoides</i> (higher shoulder than <i>Lud. formos</i>)	
<i>J. exigua</i>	<i>S. pennatus</i>
Crinoid stems	<i>J. bellulus</i>
<i>Cystura</i> Lam.	<i>C. coronatus</i>
<i>Stictopora</i> ?	
<i>Camarotoechia</i> sp.	
<i>Ambocoelia</i>	

The shale here falls to a blue clay. From about 500 paces to 594 a big bank exposes about 10' vertical of bluish grey shales, but collecting is not good here as the ^{blocks}interstices of the shale have become filled with soil from above. At 594 paces however there begins a long exposure in the stream bed. Here are found well preserved and free *J. carinatus*

<i>J. carinatus</i>	
A <i>Terebratulid</i>	
<i>S. pennatus</i>	<i>Schuchertella perversa</i>
<i>N. concinna</i> - with spines	<i>H. debayi</i> 2 specimens
<i>Cy. coronatus</i>	<i>C. boothi</i>
<i>P. rana</i>	<i>C. bellistriata</i>
<i>Camarotoechias</i> .	

At 685 paces in the bed of the brook was found a patch of small area in which *J. carinatus* and *N. concinna* were crowded in the rock, and in one concretion *J. carinatus* makes up practically the whole rock. From here and to 712 paces the following fossils were found:

P. stylopora - very large & with huge cups.
J. carinatus

N. concinna

O. undulata - 1 st. discovery of this
 The specimens of *J. carinatus* are covered
 with *S. angulatus* & *Hederella*.

At 750 paces the shales ^{are} crumbly under
 the hammer as they have done from
 600 paces up. Here is a concretion
 was found *J. bellulus*. *J. carinatus*
 continues to be the most abundant
 fossil. Others found here are *Camarotoechia*
sp. and *S. pennatus*.

At 765 paces there was a local concentration
 of *Camarotoechias* & the ever present
J. carinatus. Also *C. boothi* and *C. coronatus*

At 825 paces there is a continuous band
 of ls. that crosses the bed of the stream &
 forms a 4' cascade and a flat in the
 stream bottom. In the shale just below
 this ls. were found:

C. bellistilata

J. carinatus

Camarotoechia

S. pennatus

J. uniaangular ?

The limestone is 5-6" in thickness and
 consists of shaley ls (ls that breaks in
 plates & contains considerable clay in its
 make up. and harder concretionary
 masses in the same bed. This stone
 must be the same as that seen
 in Cozenovia gorge above the Tichenor
 & in Murder Ck. above the Tichenor
 & at 18 mi Ck. Few fossils were seen
 here and they are

J. carinatus

pentagonal Crinoid
 stems.

S. angustatus ?

C. coronatus

S. pennatus

At 935 paces blue shales are again prevalent. These have large calcareous concretions in them which in turn contain small black concretions. The fauna here is:-

A. large spirifer	A. pleurotomaria
S. pennatus	
C. coronatus. c	
G. carinatus	
A. spiriferoides	
P. lanceolata	
C. boothi var collitales	
Grammysia liata	
P. muta	
B. beda	

In the bed of the brook, not in place were found there 2 cup corals & a *P. stylopora*.

At 1000 paces is a large exposure, about 15' vertical, however not good for collecting. Along the bed of the brook here is a line of large spherical concretions in the shale and the line of the concretions and included in the bottom half of them fossils are numerous as follows:-

P. rana c	C. bellistriata
R. vanuxemi	A. spiriferoides
C. scitulus	Spirifers
Schuchertella sp.	A. Terebratulid
Orthoceras sp. with	Hebertella
Streptelasma	S. andaculus
S. pennatus	Chaetetes
Stylopora?	A. umbonata
P. muta	Aviculopecten
Small black concretions.	

At 1400 paces about 15' of shales are exposed but they are not accessible for collection.

At 1470 a similar number of feet

of shale is exposed the lower 2' of which abounds in *Ambracelia* cf. *umbonata*. *Pholidops* *ham.* was also seen here.

At 1665 paces about 9' above stream level the Genesee is exposed.

At 1925 paces the Genesee crosses the stream.

At 1859 paces there is a small outcrop of rock. Concretionary ls. in the stream bed about 6" above H₂O, then a lens of pyrite 2" thick then patches of Genesee in the hill slope.

Genesee ? thickness
6" pyrite
6" subcon

Fossils noted in the concretionary ls layer are:-

Fossils are not abundant here as only 1 specimen each of *M. oblongatus*, *S. pennatus* and *Chonetes* cf. *nummularius* were found. All of the rock here at the contact is hard and calcareous.

A few steps farther upstream at the same horizon was found in a shaly stone was found

P. yana c

M. concentrica

A. reticularis

C. boothi

S. pennatus

C. setigerus

Pyrite - has many crinoid stems, fresh when moist, carbonized leaves that lie on them. Sometimes has black shale in it. No recognizable fossils seen.

At 1297 paces a small exposure of soft blue-grey shales yielded:-

Rhipidomella sp.

A. spiriferoides

A. reticularis

S. pennatus

P. rana

Cyrtodictya (*Stictopora byzgia*) abundant

S. arctostriatus ?

C. bellistriata

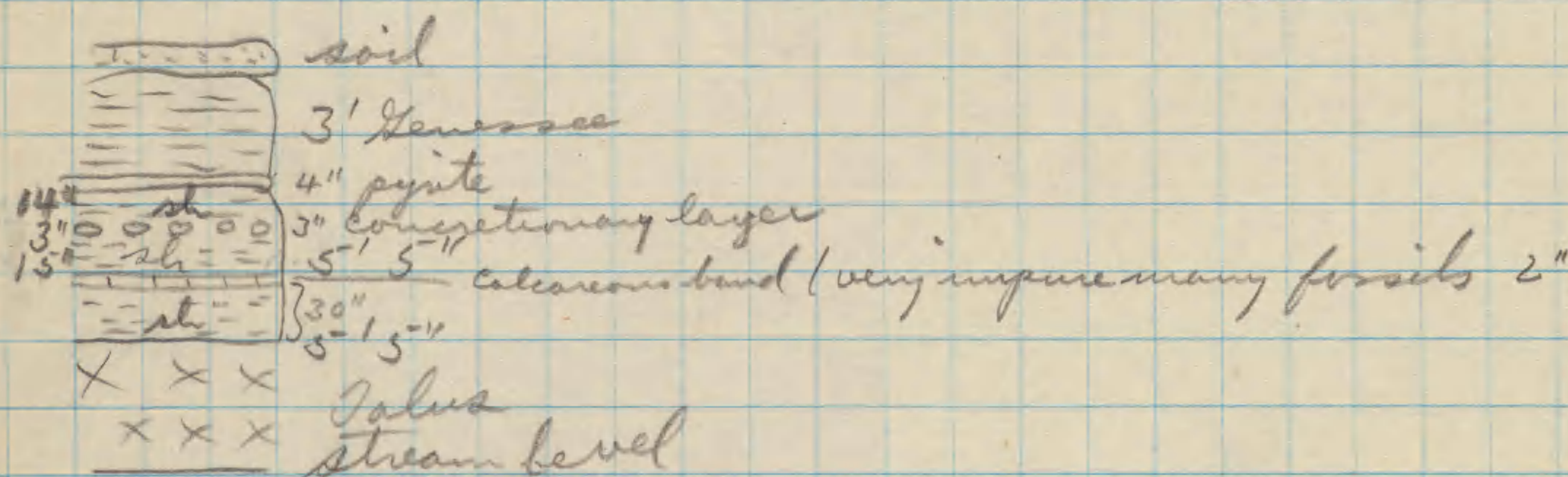
S. junia (?)

C. setigera

Small cup corals (*Amplexus*)

P. muta

At 1665 paces the following section was studied



Five feet 5" of rock are covered by talus and debris from above. Just above this are 30" of shale. Then an impure calcareous band with concretions and many fossils. Then 1' shale and a band of concretions probably represent the *S.* horizon seen at other localities. Another foot of shale is terminated by a 4" layer of pyrite which thins out within 10' in a downstream direction. There is fully 25' of it exposed horizontally.

Fossils found here are :-

In the shales

P. pstulus

A. reticularis

C. coronatus (loose)

R. penelope (" in debris)

In the 2" calcareous band :-

D. lineatum r

A. spiniferoides r

A. reticularis c

R. fimbriata r

R. cyclus r

Platyceras sp. r

P. rana c

M. mytiloides ?

C. mucronatus c

M. concentrica r

S. perversa c

Cup coral

This may, and is probably only a lens
There is considerable pyrite in these
rocks, mainly in the form of concretions

At 1000 paces in the soft shales above
the concretionary band were found :-

C. mucronatus cc

Ambocoelia umbonata (præumbona ?)

C. scitulus

P. rana

Palaeoneilo concentrica.

These shales where exposed in a vertical
bank are almost impossible to collect as
the rock merely falls to tiny fragments on
the least blow and the pieces are coated
with soil from above.

Below the concretionary bed a *Sosseletia*
& a large *Spinifer*

Bowen Brook
July 26

20 paces above bridge comes first shale
above the Tichenor

Crinoid stems *A. densata* *Lezula* sp.
R. vanuxemi

30-72 covered

72-89 - Blue grey shale, some crinoid debris

Cammatocidia sp. *A. spiniferoides*
C. micissimata *A. knabiana*
T. coronatus *C. indenta*

89-235 - covered

235-248 - soft blue-grey shale weathers
to a olive clay. Crumbles to small fragments
Fossils scarce.
S. pennatus

248-308 - covered

308 -

At 420 is a bank of shale about 25'
high. From 520-600 a bank of shale
varies from 75' at 540 to 8' at 600
In the shale from 308-640 were seen

A. spiniferoides *T. casimatus*
P. styliporum *C. boothii*
S. pennatus *P. rana*
C. coronatus (630 paces) *O. grandis?*
H. concinna *Arcinlopecten* sp.

At 692 paces *H. concinna* is abundant in
the stream bed. At 730 concretions abound
in the bed of the stream

770-766 bank of shale 8' high at 766
is a calcareous layer 6 1/2' above
stream level.

At 785 *A. erectum* was seen, *C. scutell*
S. pennatus, *Cammatocidia* sp., *Ammono*

O. undulata

At 875 paces the calcareous layer forms a 3' cascade in the stream bed. Fossils in the shale below the calcareous layer are:

*P. styloporum**T. carinatus**A. andacule**P. rana**C. boothii**S. pennatus**A. spiniferoides*

Fossils in the calcareous layer 6" irregular concretions are, *T. carinatus*, *C. coronatus*. The ls. is rather hard in the concretions but shaly between. *S. pennatus*.

985 - shale and concretions

At about 1110 a layer of concretions is cut stream layer. The concretions are individual and are spaced from 0-3 or 5' apart they are about 1 1/2 - 3' across, and about 6" thick. Between them is about 2" of calcareous shale abounding in small black concretions and fossils. The concretions also contain the black concretions. Fossils:-

T. carinatus a*C. coronatus* a*P. rana* a*R. campenii* a*S. pennatus* re*C. boothii* re*M. concentrica* a*Chaetetes* sp. re*A. macrostoma* re*A. decussata* a*C. bellistriata* re*C. inaequalata* re*D. inaequistrata* a*A. reticularis* a*R. fimbriata* a*P. nodocostata**Pal. crata**Pal. constructa**Arctipecten* sp.

Many of the black concretions contain fragments & shells of *Orbiculoides* and *Lingula*.

Ambocoelia is seen 1st about $6\frac{1}{2}'$ above the concretionary bed and become abundant at $11'$, continuing abundant to $15'$ after which examination could not be made. Thus the Ambocoelia beds come in about $7'$ above stream level at 1100 feet

1100 - 1470 - covered

1420 - 1470 - coarse, about $15'$ high. Ambocoelia occurs at the stream-level and for about $6'$ above.

1540 - 1557 - about $10'$ shale

1730 - it is $10' 10''$ to the base of the pyrite

1920 - Pyrite is at stream-level.

Topographic map of the Bullis D5 Bridge area in Marilla, Alaska. The map shows Little Creek and Buffalo Creek, with the Bullis D5 Bridge crossing Little Creek. Key features include Jamison Road, Girdled Road, and East Elma. Elevation contours are marked with values like 757, 785, 790, 800, 830, 838, 840, 844, 859, 870, 880, 900, 912, 919, 937, and 942. The map is labeled with "ROAD", "Creek", "FORD", "Bullis D5 Bridge", "Marilla", "Jamison Road", "GIRDLED", and "East Elma".

1978

Tulunor Bullis Bridge

1. Grey crinoidal limestone with much shale especially at the top. Corals are fairly common.

A. macronota

The limestone is in nodular masses rather than in layers here.

A. decussata

P. rowi

S. pennatus

S. junia

P. fimbriata

P. hana

R. canisani

H. confluent.

2. 5" - 8" - 12" hard semi-x-lr ls. dark grey many Favosites. Thickness very changeable. At the falls bed 2 has either disappeared or become very thick, which is the case being 12" at the falls.

D. sculptilis

3. 11" - 1' of hard, massive crinoidal ls.

V. pustulosa a

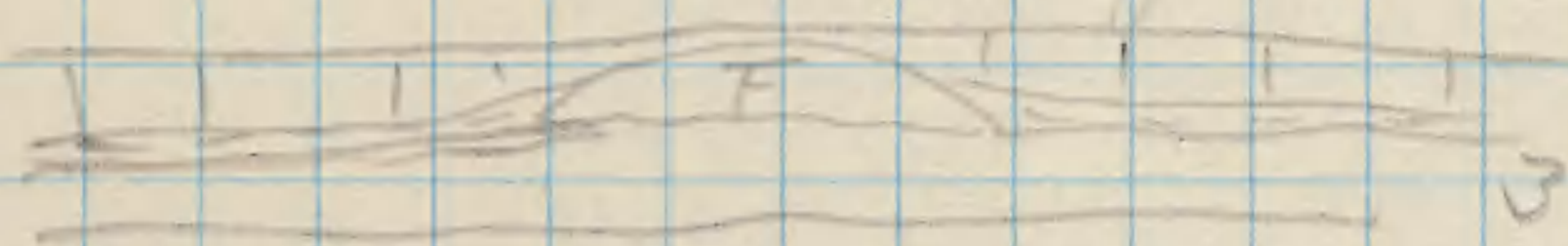
R. penelope

A. mammosa.

This bed also thins & thickens rapidly. It is probably to be correlated with Horse Creek of L. shore. Contains large heads of *Favosites* also.

As thin at the falls. *V. pustulosa* was only seen in this bed.

4. Shale 3" - Abounds in corals, one *Favosites* is about 3' in diameter. It is covered with crinoid bases. The ls layers thin above the coral head.



C. subcaespitosum

5. Hard grey ls.

6. shale and nodular ls.

T. carinatus

A. spiniferoides

D. insignistrata

R. granulosa

P. rowensis

S. plumatus

P. rana (large)

A. macrota

L. perflava

Lch. demingensis

R. penelope

Trilobian section at Bullis Bridge

7	7" ls.	7
6	1' 3" sh + nodular ls.	6
5	6" grey ls.	5
4	3" shale	4
3	11" Crin. ls.	3
2	5" Crin. ls.	2
1	1' ls + sh	1

5' - 5 1/2"

Ludlowville

Fossils in whole section

<i>A. aculeatum</i>	<i>A. decussata</i>
<i>H. confluens</i>	<i>H. variegata</i>
<i>P. confluens</i>	<i>A. spiniferoides</i>
<i>P. vana</i>	<i>P. orthoformis</i>
<i>P. pavilionensis</i>	<i>A. granulosa</i>
<i>L. papillata</i>	<i>J. barbatula</i>
<i>S. pectinatus</i>	<i>P. marginatula</i>
<i>C. planirostra</i>	<i>S. penica</i>
<i>C. lythri</i>	<i>P. vana</i>
<i>F. billingsi</i>	<i>A. princeps</i>

Section at falls.

Many of the corals in the ls. & sh. are upside down.

limestone	8"		corresponds to 7
Sh. & ls.	1' 4"		5
Sh. with corals	2"		4
Hard ls	7"		3
Hard massive ls	1'		Probably corresponds to 2
Grey ls + shale	1'		1

7. hard, non-crinoidal, grey ls.
- | | |
|-------------------------|--------------------------|
| <i>D. inaequitrata</i> | <i>C. sticticus</i> |
| <i>A. spiniferoides</i> | <i>S. permatus</i> |
| <i>P. rana</i> | <i>L. junia</i> |
| <i>L. perflava</i> | <i>Protoductella</i> sp. |

Moscow section at the ^{bridge} ~~bridge~~

Shale at Tichenor contact has crinoid stems and:

- | | |
|----------------------|---------------------|
| <i>T. limbata</i> | <i>R. variegata</i> |
| <i>C. mucronatus</i> | <i>P. rana</i> |
| <i>C. vicinus</i> | |

7 1/2' above the contact *Amboecia* abounds
Here also was seen *I. carinatus*, *A. arcula*

17 1/2' above Tichenor is a layer of shaly ls.
possibly the *Streptelasma* bed. At 210 paces from
the bridge to 3' above stream were seen
A. reticularis, *A. umbonata*, small corals, *P. rana*
H. delessyi, *S. permatus*, *P. fecunda*

11' above stream-level at 300 paces is
the *Streptelasma* bed which appears to be
1' thick it is very poorly defined & has few
fossils. *Streptelasma* is present however.
P. bathy, *I. submarginata*. Below it are
3 thin bands of ls.

The calcareous shales here when fresh are a very dark grey but where they have been sun baked have a light tan on the surface. This railroad was traversed south to the next highway crossing about $1\frac{1}{2}$ miles from the starting place but no additional exposures were found.

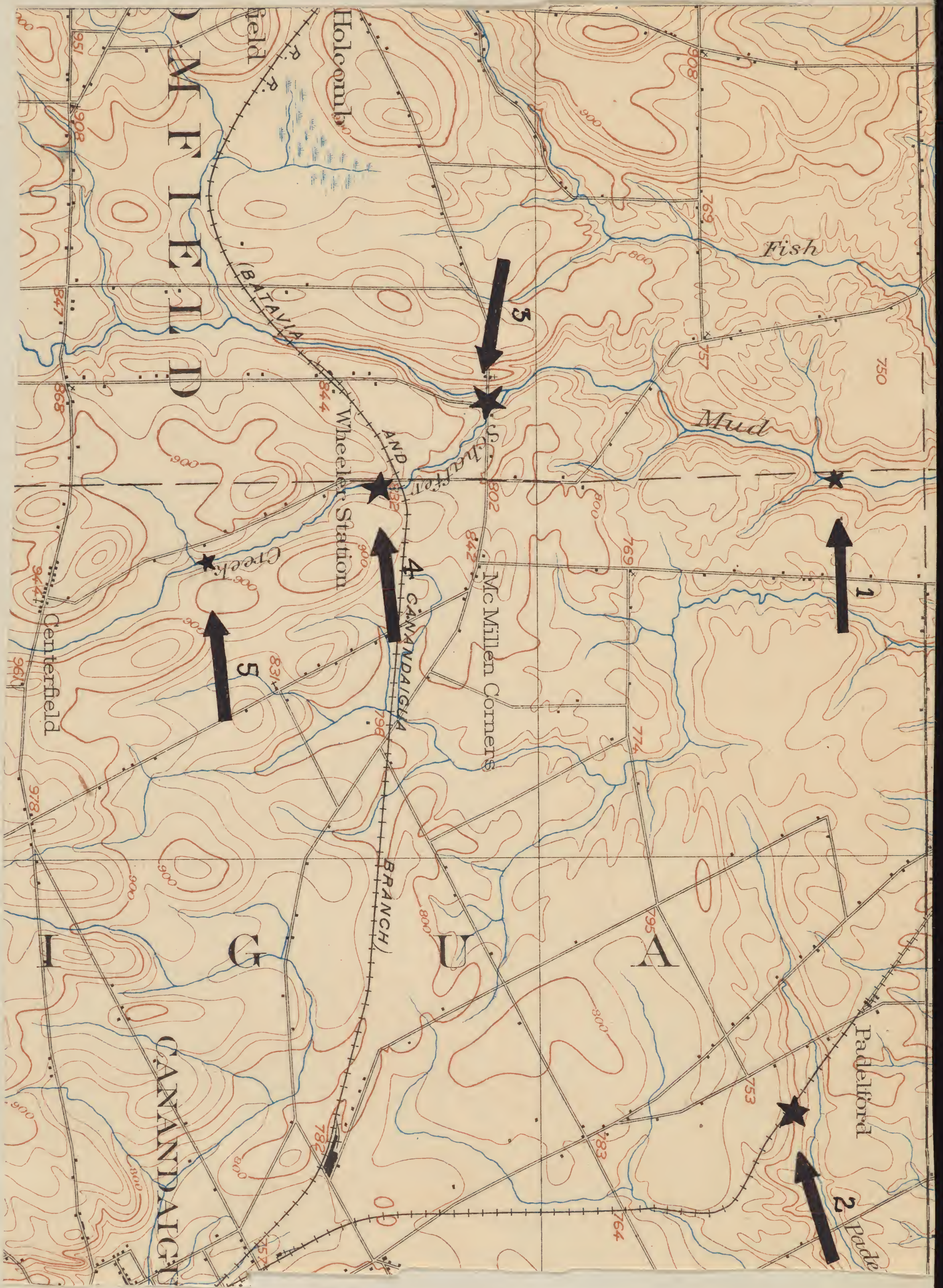
~~357 Railroad~~ was followed down to the next road that crosses it but no additional rocks were found.

August 1.

Mud Creek.

At 3590 paces from the Onondaga outcrop near *Mertensia* were found in the bed of the creek black shales and limestones crowded with *L. limitaris*. The limestones were in place but the shales were in loose blocks. A snail and a small *Pterinea* were also found. This outcrop continues to ~~3663~~ 3663 paces.

At 4032 paces is a rather extensive outcrop about $5\frac{1}{2}'$ vertical and exposed along the bed of the stream for fully 200 yds. These are dark grey or nearly black calcareous shales weathering to small fragments. Everywhere they abound in *L. limitaris*. On the surface they are weathered to a light tan or grey. At 4200 paces in the bank about $10'$ above the stream are shales, highly calcareous and dark grey in section. They are not black in section. These weather on the surface to a light grey. Fossils were not abundant here.


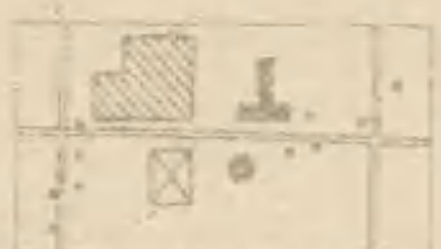

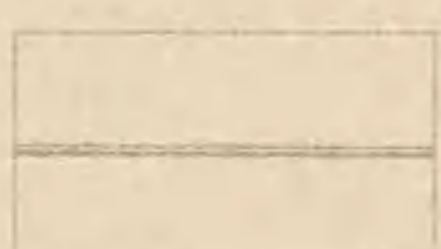






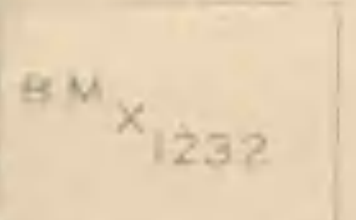






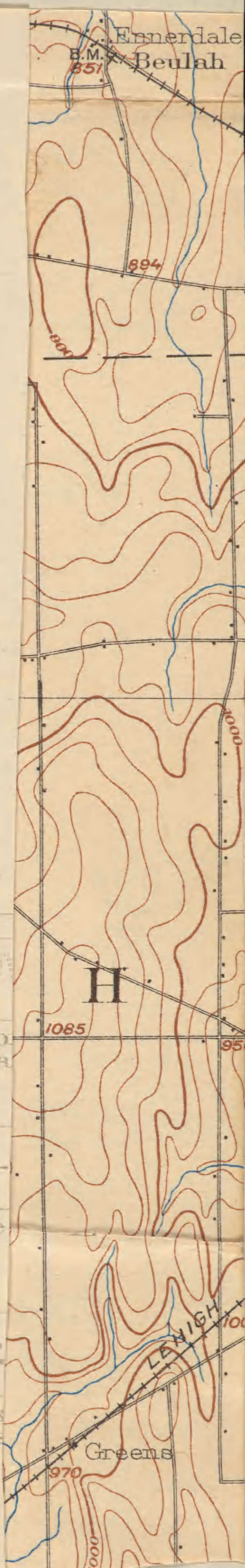
t of the remaining area surveyed in Alaska has
ed on a scale of $\frac{1}{250,000}$, but about 3,500 square miles
apped on a scale of $\frac{1}{62,500}$.

part of the Hawaiian Islands has been surveyed,
ulting maps are published on a scale of $\frac{1}{62,500}$.

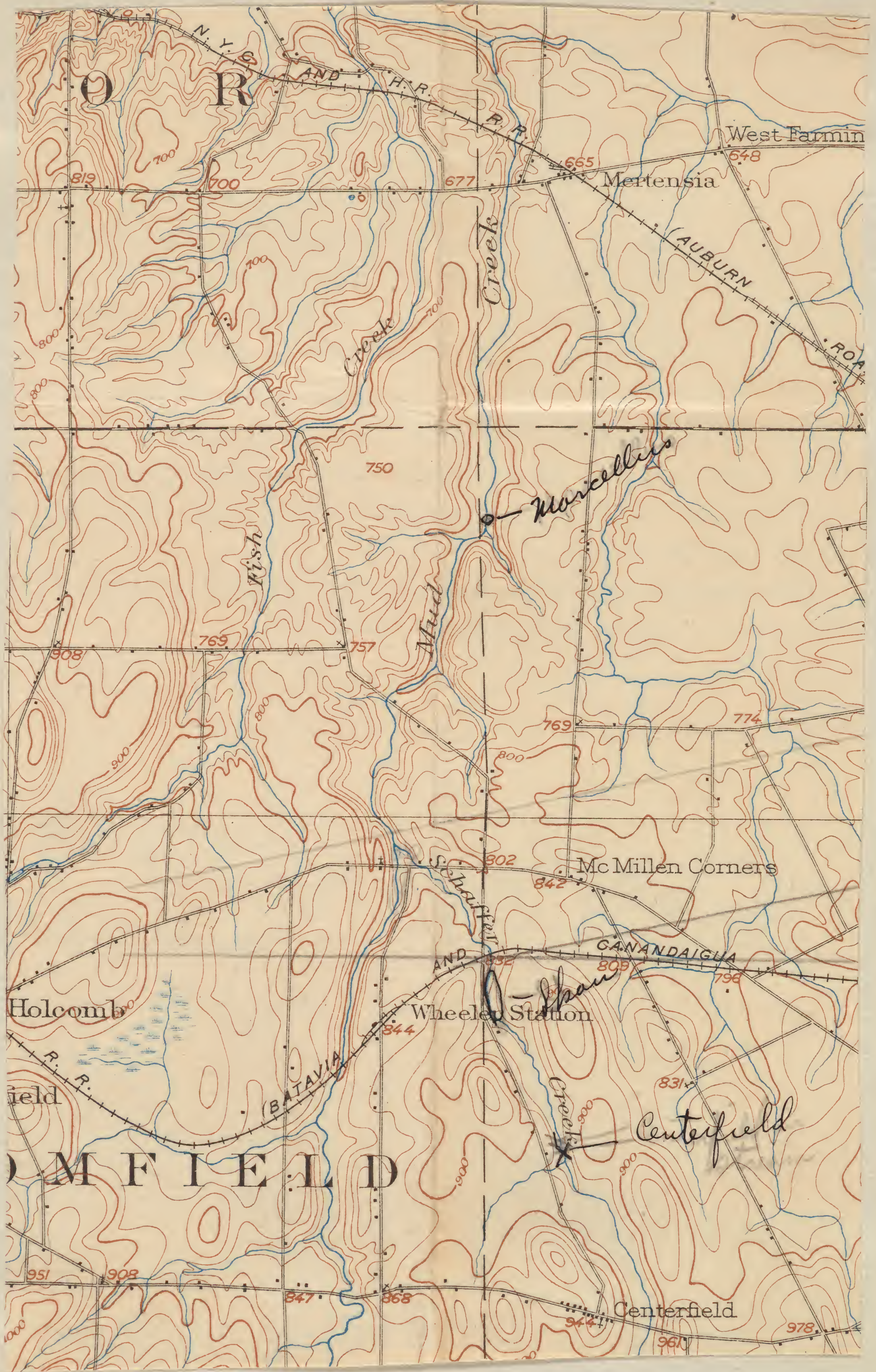
ures shown on these maps may be arranged in three
(1) water, including seas, lakes, rivers, canals, swamps,
bodies of water; (2) relief, including mountains,
s, and other features of the land surface; (3) culture
man), such as towns, cities, roads, railroads, and

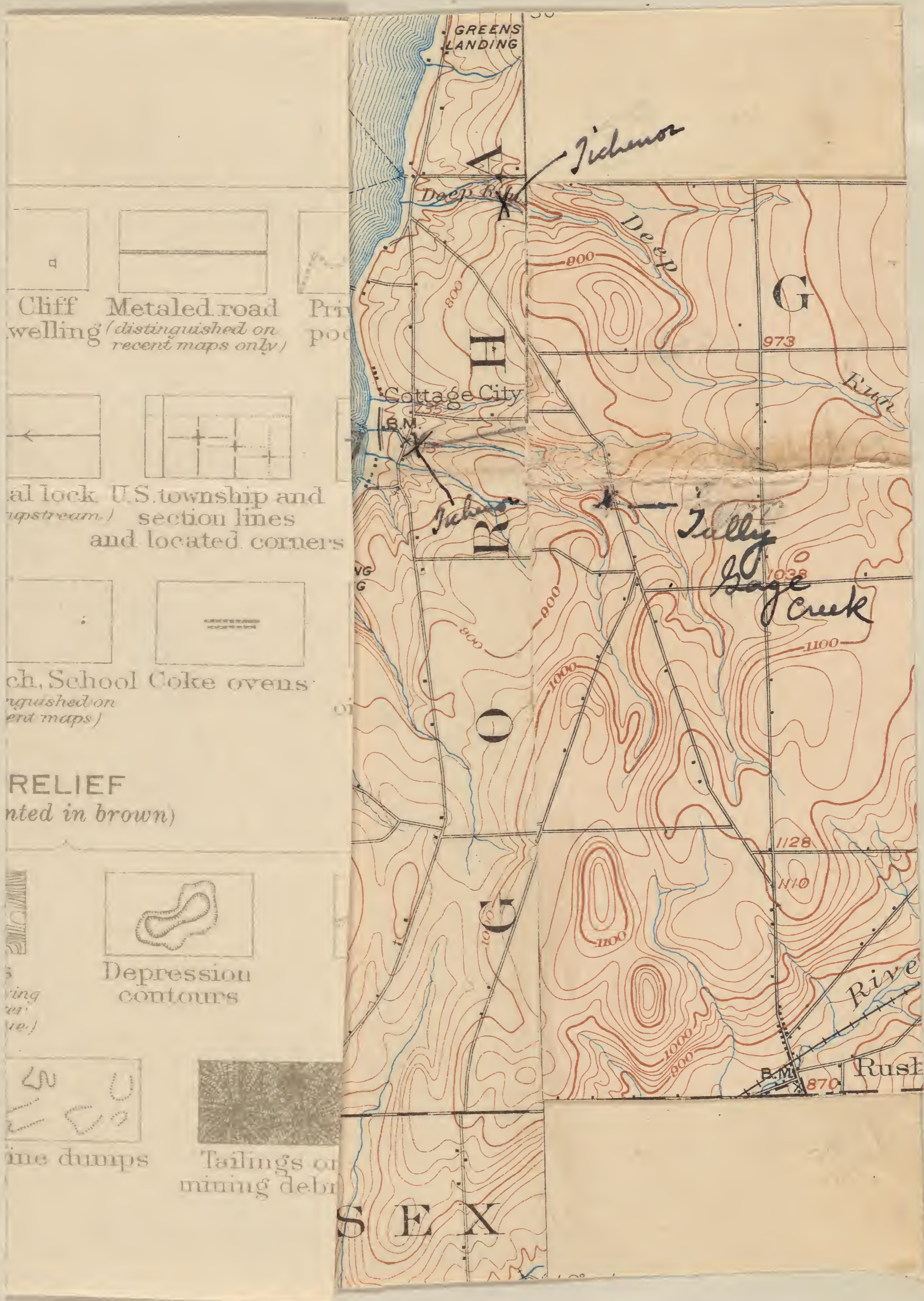
The conventional signs used to represent these
shown and explained below. Variations appear on
r maps, and additional features are represented on
l maps.

				
City or village	Roads and buildings	Ruins	Cliff dwelling	Metalead road <i>(distinguished on recent maps only)</i>
				
Dam	Dam with lock	Canal lock	U.S. township and section lines <i>(point upstream)</i>	State
				
Bench mark <i>(if bench mark shown cross and black without lettering)</i>	Cemeteries	Church	School	Colt ovens <i>(distinguished on recent maps)</i>
RELIEF <i>(printed in brown)</i>				









July 31.

Camandigua

~~Marathon~~ Cardiff

Along the railroad cut at Padelford the first rock met is at 893 (2000') from the railroad and highway crossing on the west side of the cut. Here the rock is a ls in layers (one layer noted) about 3" thick of hard grey (blue grey) limestone, resistant to the hammer and breaking with a conchoidal fracture. Most of the stone however is a hard calcareous shale that is brittle and dark grey in cross-section. The shale weathers into blocks or large chips. In the lowest foot of beds and in the thickest of the limestones *L. truncata* is common. Other fossils noted here are:-

*L. limitaris**P. fragilis**Lepteria* sp.
$$\begin{array}{r} 893 \\ 890 \\ \hline 3 \\ \hline 37 \frac{1}{2} \end{array}$$

At 930 paces and about 20 paces W in a recumbent where the hill rises is a large exposure of calcareous shales. Here the rock has been subjected to the rigors of the sun & rain and the rock is broken into small chips, or thin flakes or in rarer cases into flat plates. The rock gives ready effervescence with HCl. The shale joints blocks have a conchoidal structure, breaking into irregular curved masses which break either into flat plates or irregular chips sometimes with curved surfaces. Fossils are fairly abundant but isolated. Here were noted:-

*Buchiola retrofracta**L. limitaris**L. laevis?**E. regulata?**P. discoides**C. macronotus*

The total thickness of these calcareous shales at 930 paces is 7'.

Cardiff.

On Luther's & Clarke's Onondagua report they map the Skaneateles - Cardiff contact about $\frac{1}{2}$ " north of the confluence of Mud Creek with Shaffer Creek, yet in the text they state that the Cardiff is well exhibited at the juncture of the two ~~cliff~~ creeks.

Exposure at the juncture of Mud and Shaffer Creeks. The rocks here are highly calcareous at the juncture of the creek and may well be called limestones. On a small gully facing Shaffer creek two large samples of this stone have been subjected to weathering and they are pockmarked ~~with~~ with long pits along the bedding planes where certain of the beds have been etched out. Again the stone may split into flat plates varying from almost paper thickness to an inch thick. The surface of the rocks is a light grey, even blue grey in places. The limestones are often very hard and sometimes have a conchoidal fracture.

Fossils:-

O. minuta 1 c

S. truncata

P. discoides

Leiopteria sp.

L. limitaris

N. triquetra

C. minutus

About 200' south of the juncture of the two creeks about 8' of rock are exposed above the creek bed. These break into small slabs or plates. Here *O. minuta* is quite common. 300' from the juncture of the 2 streams are about 15' of the same shales, brittle and calcareous. The Cardiff-Skaneateles boundary must be here somewhere but all of the shale looks alike. However

L. limitaris is not abundant here

About 300' from the junction of the 2 creeks, and on Shaffer Crk. about 15-20' of calcareous shales are displayed. These are not very fossiliferous but carry a small *Brachiodonta*, a *Lepteria*, *E. rugulata*?, *L. limitaris*

Skanateles:-

According to the text in Bull 65: "These deposits are exposed in the bed of Mud Creek south of the highway bridge near the junction of Shaffer Creek, $\frac{1}{2}$ mile north of Wheeler." The shales are very dark gray, not quite black, very calcareous and brittle. The rock is exposed for fully 200 yds in the bed of the creek, and vertically from the bridge for practically 5-6'. These layers are the same as those noted above the hard limestones at the junction of the two creeks, and those noted above on this page. These brittle shales have in the upper portions of this exposure on the south side of the bridge ~~two thin~~ layers of ls. which account for the calcareous in the creek. The fauna here is small and fossils rare. The most abundant animals that I found were small *Pelecypods*:- *Lepteria*, *Brachiodonta*, and *Actinopteria*. Other fossils are:-

G. subulatum

L. limitaris

M. triquetra

Amboecia sp.

If the beds at the junction of Shaffer and Mud creeks are Cardiff then the Card-Skan contact must come between the junction of these two creeks and the highway bridge. There is very little lithologic difference in the

rocks. The beds right at the juncture of the creeks are somewhat more compact and have thicker limestones. I am sure there is practically no difference between the two beds here. I noticed however that *O. minuta* was not found above about 6' above the juncture of the two creeks. That would mean about 3' above the ls. at the juncture.

The "Cardiff" stone at the juncture of the two creeks extends northward, doubtless about 100 yds. The dividing line between Shan + Card. cannot be where the zone of *L. limitaris* ceases in abundance as the lists give *L. limitaris* as (c) common for both formations. I found *L. limitaris* about as common at the juncture as south of the bridge.

The 15 or more feet of ^{Dark} shales on top of the limestones or calcareous shales at the juncture of the streams is ~~is~~ certainly breaks into small pieces and weathers into thin flakes, but of rather large size 1"-2".

Shan. Shaffer ls.

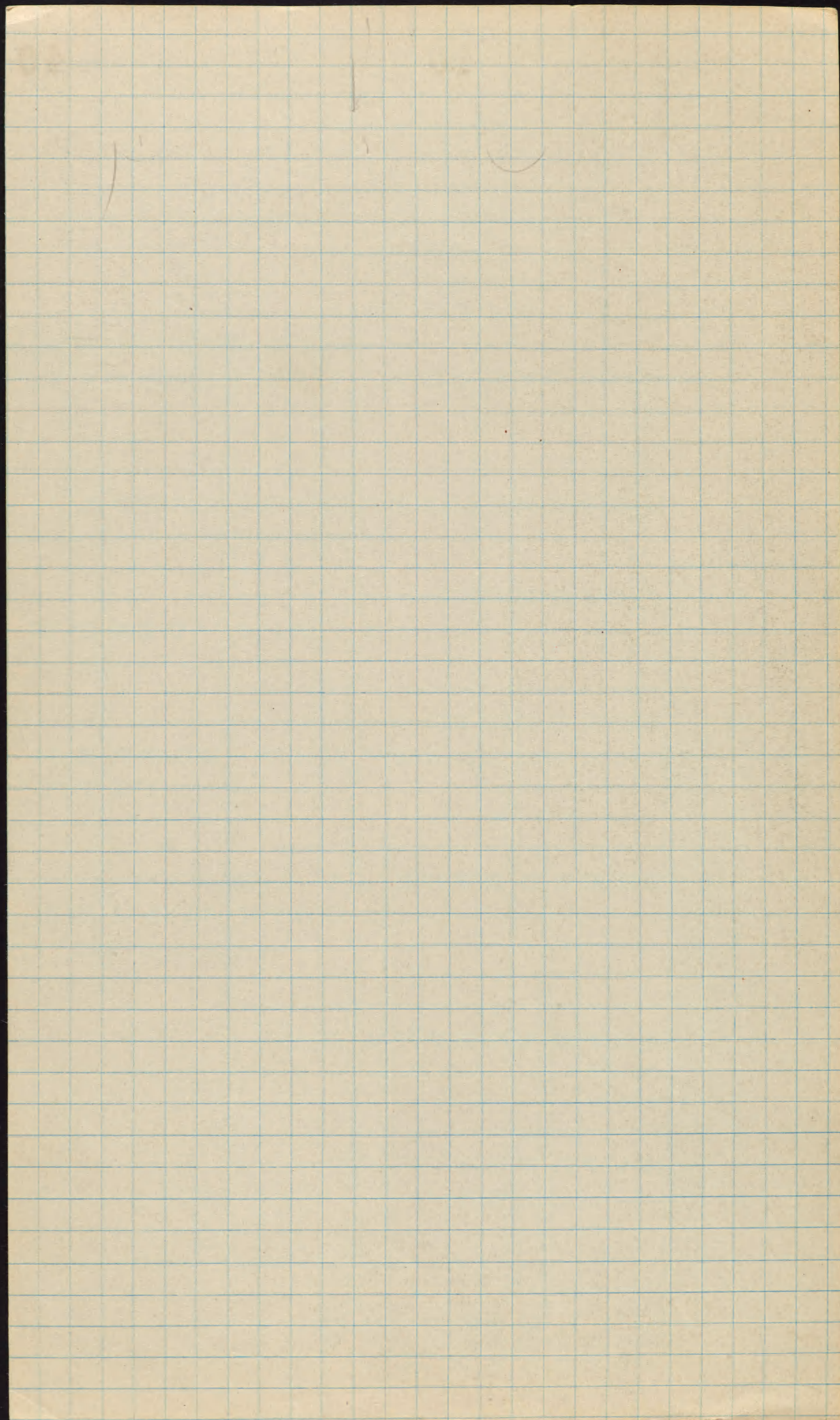
50 paces south of the railroad bridge in the bed of the brook are soft, calcareous shales. ^{recognizable} The fossils here.

80 paces soft, dark gray shales in a similar position, weathering to a lighter gray.

125 paces a somewhat larger exposure of the same.

165 paces *G. subulatum*.

From 244 paces to 550 paces there is an almost continuous exposure. The shales are calcareous and have a concretionary or irregular blocky structure.



L. curtum ?
S. fissurella

C. mucronatus

at 295 paces *L. limitaris* is very common. From 400-535 paces the stone is harder, probably because it is fresher, and large blocks of it can be found in the bank just below the road. The shale here is quite fossiliferous and has the following

L. curtum rc
Parenka sp. rc
P. discoidum rc
S. subulatum rc
Orthoceras sp. rc

S. fissurella ! c
N. triquetra
 small badly crushed snails

August 2.

Shaffer Creek.

Section on Shaffer Crk.

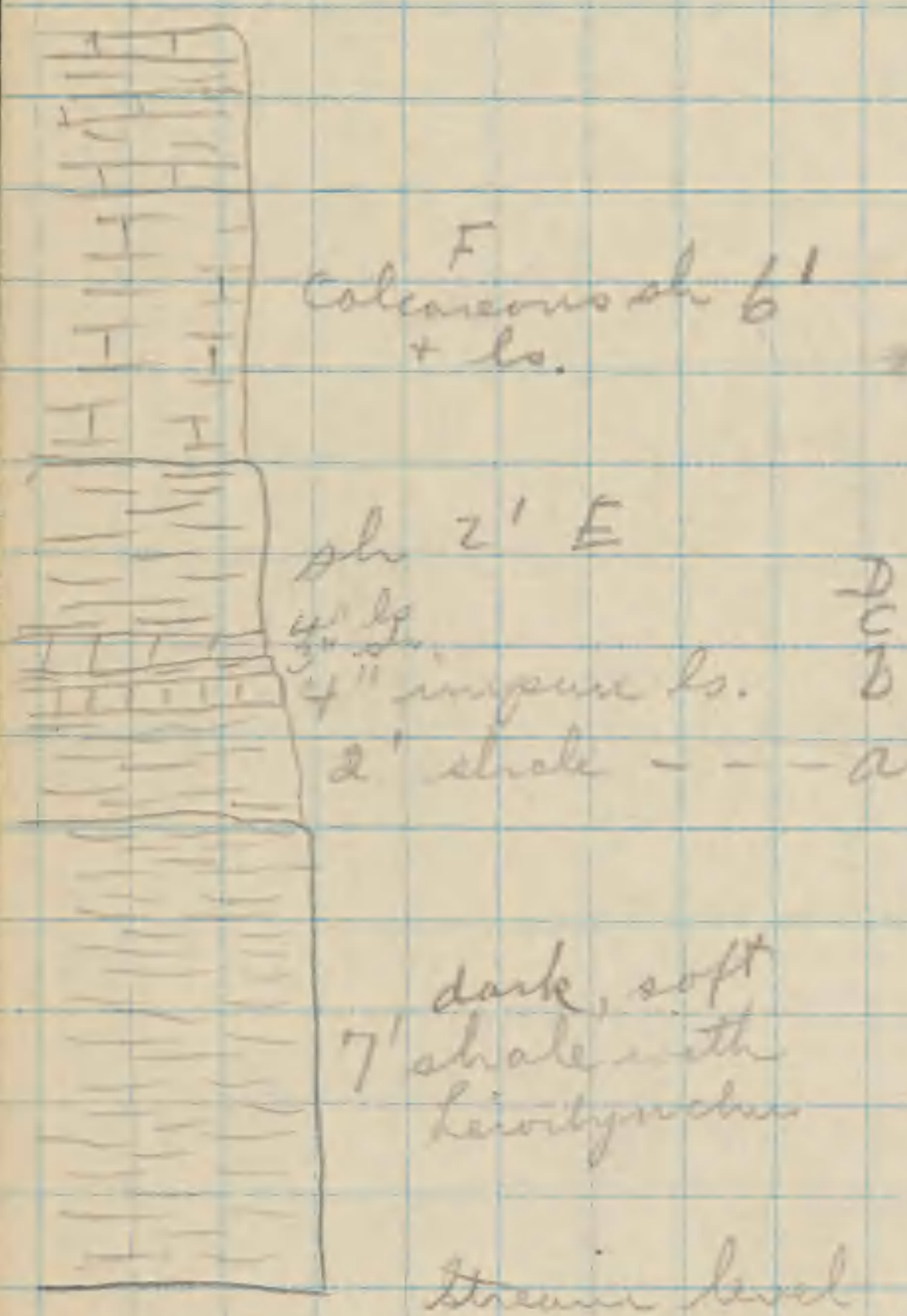
The lowest shales observed here are soft, somewhat friable shales very dark grey in section, faintly gritty when gnawed with the teeth, giving a rather vigorous effervescence with acid on a fresh fracture and yielding a brownish grey streak. These are revealed for about 4' vertically about one foot above the stream. They are quite fossiliferous and the following species were found:-

L. fissurella cc	Camerotheca sp.
L. curtum or	N. triquetra or
L. laura c	S. pennatus or
E. regulata ?	C. setigerus

At about 7' above stream level the shales begin to lose their friability, split into chunky pieces and not into flat chips. The fauna also changes. The *Liothyris* and *S. fissurella* pass on and there comes in in the next 2':-

A. spiniferoides	P. sawensis
A. reticularis	P. oblata or
A. umbonata c	C. sapho
C. mucronatus	Cyst. hamiltoni
P. punctilifera	

This shale which breaks in chunky fragments gets more and more fossiliferous till it meets at 4" below of



of soft argillaceous ls. Then follows 3" of the same kind of shale which has corals, then 4" more of harder ls. Then 2' shale abounding in fossils.

I have lettered these beds from the bottom up and will attempt to get a fauna for each.

Bed a

<i>A. spiniferoides</i> ✓	<i>A. reticulatus</i> c	<i>P. iowensis</i>
<i>A. umbonata</i> ✓	<i>C. sappho</i> ?	<i>Cyrt. liam.</i>
<i>P. oblata</i>	<i>C. mucronatus</i>	✓ <i>P. punctilifera</i>
<i>Pal. pinnata</i> ✓	<i>P. fimbriata</i>	✓ <i>M. concentrica</i>
<i>S. densa</i> ✓	✓ <i>S. concava</i>	✗ <i>M. concinna</i>
<i>P. rana</i> ✓	<i>Platyceras</i> sp.	<i>Cyrtodictya</i> sp.
<i>S. pinnatus</i>	Cup corals.	<i>Byozoa</i>
<i>Chinidea</i>	<i>Strophomena</i>	

The cup corals were noted only near the top of the bed.

Bed B. 4" ls.

✓ <i>P. fimbriata</i> ✓	✓ <i>C. bellistriata</i>	<i>A. spiniferoides</i> ✓
<i>C. sappho</i> ✓	<i>Honiophora</i> sp.	<i>Lichenalia</i> sp.
<i>A. reticulatus</i> ✓	<i>C. boethi</i>	<i>P. rana</i> ✓
✓ <i>M. concentrica</i>	<i>D. lineatum</i>	<i>Aviculopecten</i> sp.
<i>P. iowensis</i>	<i>A. umbonata</i>	<i>Platyceras</i> sp.
<i>C. mucronatus</i>	✓ <i>C. indenta</i>	✓ <i>C. boethi</i> ✓
<i>P. penelope</i>	<i>P. pavilionensis</i> ✓	

Bed C.

Shale + Shaley ls.

<i>P. iowensis</i>	<i>A. boylii</i>	<i>S. macronotus</i>
<i>Favosites</i>	Cup corals	<i>P. iowensis</i>
<i>Conocardium</i> sp.	<i>P. lirata</i>	<i>M. concentrica</i>
<i>D. sculptilis</i>	<i>C. coronatus</i>	<i>R. penelope</i>

Bed D. 2' shale

<i>Lecanospira</i> Ham.	<i>C. boathi</i>
<i>A. reticularis</i>	<i>S. concava</i>
<i>P. rana</i>	<i>Lechinolia</i> sp.
<i>H. halli</i>	<i>R. variegata</i>
<i>D. sculptilis</i>	<i>Favosites</i>
<i>C. coronatus</i>	<i>S. andaculus</i>
<i>Platyceras</i> sp.	

} Bed E

The shale here is rather soft and can be crumpled in the hands. All of the beds carry corals.

Bed F

Consists mainly of calcareous shales, impure limestone that is hard and resistant and mixtures of the two. This rock forms a cascade in the creek. The stone is a medium dark grey in section but a light grey when battered. A good deal of it is tan on the surface from iron rust. The weathering of the stone in the creek leaves irregular knobs of the harder masses.

Corals are quite abundant, the genera being:-

Zaphrentis *Cyathophylloids*, *Cyathophylloids*
Favosites, etc.

Other fossils are:-

<i>I. carinatus</i> (large, transverse, in upper beds)	
<i>R. variegata</i>	<i>N. concinna</i>
<i>P. hirsuta</i>	<i>S. divaricatus</i>
<i>P. iowensis</i>	<i>M. oviformis</i>

I would locate the Centerfield behind the first house on the east side of the road just over the brow of the hill. There is a small stream running thru the orchard by this house and between it and the only other house on the east side of the

Menteth Ravine

45

45

August 3

Falls with Menteth is about 250 paces from road 60 paces above the falls at the Menteth ravine are 45 or more feet of shales which are dark grey in color, and in the lower part at least give no effervescence with acid. Thruout the 45' of shale measured, *J. carinatus* in large forms is common. There are also some thin bands of limestone in which *J. carinatus* plays a prominent rôle.

In some large blocks the following fossils were found:-

<i>Pleurodictyum</i> ? r	<i>C. boothi</i>	<i>M. concentrica</i>
<i>P. lanceolata</i> r	<i>C. setigens</i>	<i>S. cheungensis</i>
<i>L. punctata</i> r	<i>S. pennatus</i>	<i>Pomphorus</i> sp.
<i>C. coronatus</i> r	<i>Pal. concentrica</i>	<i>G. arcuata</i>
<i>J. carinatus</i>	<i>S. solenoides</i>	<i>O. parvula</i>
<i>O. carinata</i>	<i>N. triquetra</i> (small)	<i>A. spiriferoides</i>
<i>P. radiata</i>	<i>Lox. hamiltoni</i>	<i>Lox. delphicola</i>
<i>P. nodocostata</i>	<i>A. undulata</i>	<i>C. corrugata</i>
Large <i>Spirifer</i> , etc.	<i>G. contracta</i>	

This fauna is identical to the one carrying *Tropidoleptus* and *Pleurodictum* at Murder Creek and Fall Brook.

Between 150 and 187 paces upstream were found a crinoid calyx, large *S. muriei*?, several *Pleurodictum* & hosts of *Tropidoleptus*, also *G. lirata*.

At 220 paces the shale is just crowded with *J. carinatus*. At 240 paces thin layers of ls. are crowded with *C. incisus*, *J. exigua* & other bryozoa. Other fossils between 220 + 240 paces are *Pleurodictum*, *B. leda*, *Rhipidogella*, *A. spiriferoides*, *N. bellistrata*, *H. rana*, *J. bellulus*.

Small concretions abound in these layers above the Menteth ls. and some of them contain fossils.

At 263 paces a 2" band of calcareous shale rock with irregular & brachly fracture and largely made of fossils forms a small cascade in the stream. This stone and that below contains:-

C. impressa

R. vanuxemi c

S. granulatus

B. L. 207.00

A. ? spinifrons

S. insigniata

of decay - a pleuron.

C. coronatus c

Р. с. с

D. sculptilis

L. penetratus

Par. hamiltoniae

E. lincklaemi

Just above this come light-colored shales on the weathered surface and a medium dark grey in cross-section. These are not as fossiliferous as those below. The fossils occur mostly in layers or bands. In one of the bands just above the cascade were noted:

Cystodictya sp.

E. bellistriata

✓ *C. mucronatus*

R. spiferoides

P. exigua

V. d. phumatus

P. arctostriatus

Amurostocella sp.

Crimoid stems D. luteum

C. boothi

P. rana (large)

S. inaequistriata

C. setigerus

C. bellistrata

V. l. pennatus

O. undulata

✓ *S. pennatus*

Platyrrhinus (spiny)

V. insignis

C. vicinus?

R. vampirum

Fenestellidae

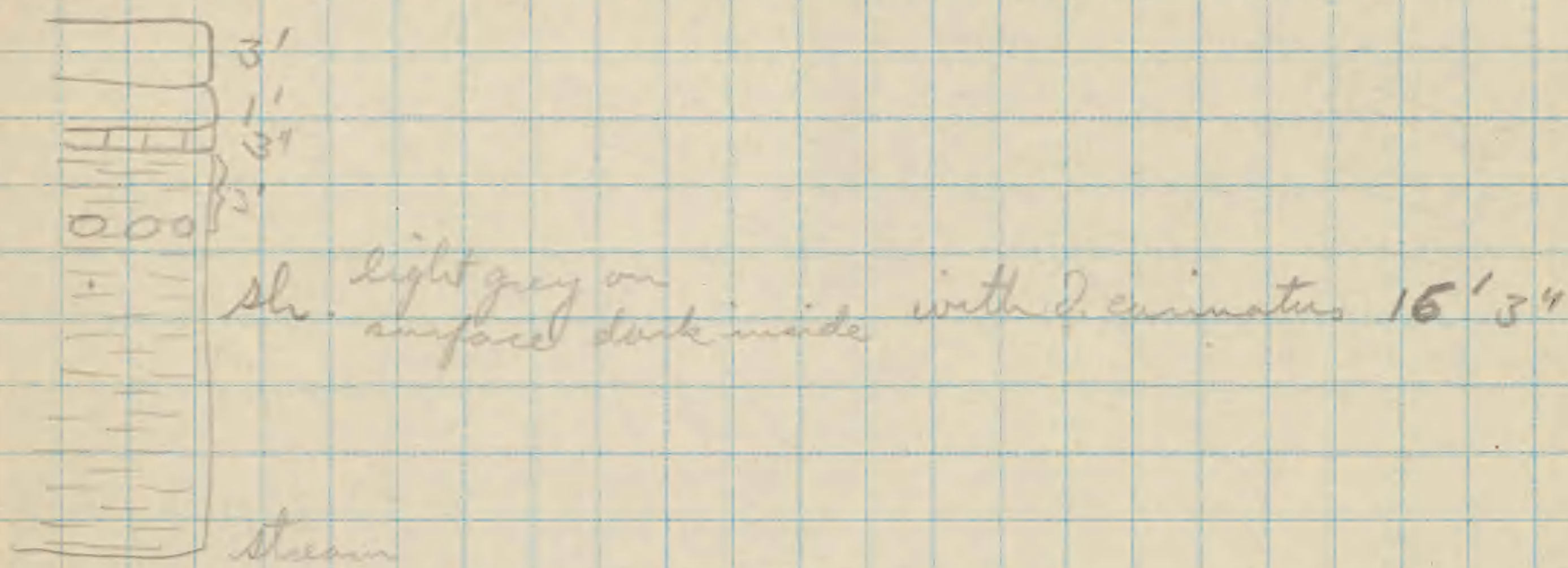
At 415 paces a thin calcareous band has *J. carinatus* & *S. inaequistriata*, the shales have *A. princeps*, *A. spiniferoides* & large *Palaeoniscus* and *S. pennatus*.

At 525 paces the shales yielded

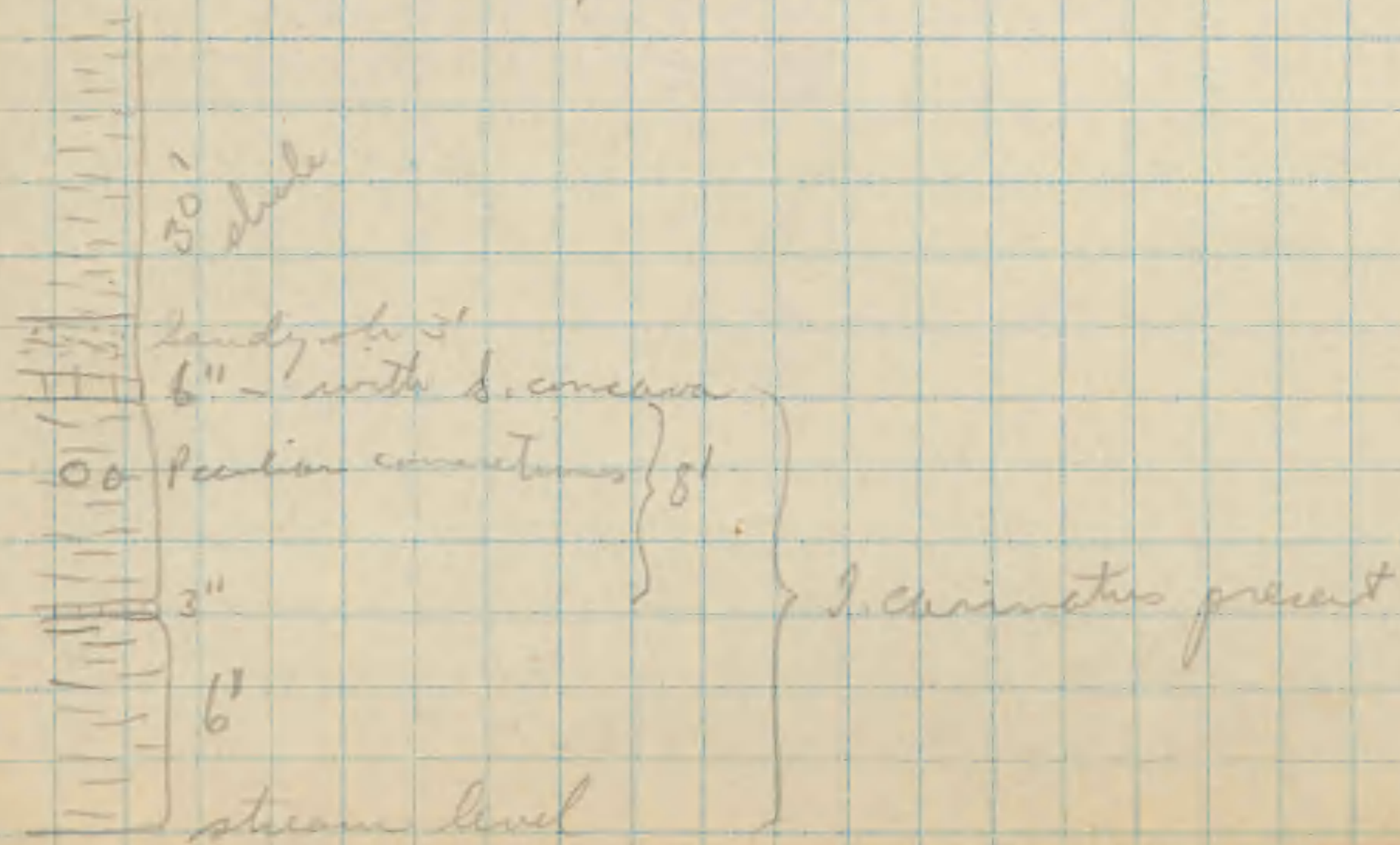
<i>Megistocrinus</i>	<i>S. pennatus</i>
<i>A. spiniferoides</i>	<i>C. coronatus</i>
<i>J. carinatus</i>	<i>P. rana</i>
<i>S. solenoides</i>	<i>Concarotrichia</i> sp.
<i>Par. hamiltoniae</i>	<i>Cryptonella</i>
<i>N. Truqueti</i>	<i>P. constriata</i>
<i>Pleurodictum</i>	

This fauna is like that below but *J. carinatus* is much less abundant.

Section at 650 paces



Section at 700 paces.



At 700 paces

R. grandis

In stream &

P. carinatus

5' above

*S. acunata**C. coronatus**Cryptonella**S. granulosa**Bryozoa*

At 1060 paces the stream bed is crowded with concretions, one of them bearing the imprint of an *A. Dehayi*. At 1117 paces *P. carinatus* is still present in the stream bed.

At 1152 paces a bed of ls. forms a cascade in the stream bed. It is very hard, bluish grey, with crinoid stems and contains a great abundance of *S. concava*.

3' above this is another cascade, at 1168 paces, the water flowing over a somewhat arenaceous shale, hard and gritty to the teeth, it is slightly calcareous. The rock in between the top of the arenaceous top layers and the ls. contain

R. fimbriata
 ✓ *A. reticularis*
 ✓ *S. concava* c
 ✓ *Proetus* sp
Cystodictya sp
C. boothi
 ✓ *M. concentrica*
C. boothi
 Cup corals
S. pinnatus i

✓ *S. granulosa*
 ✓ *P. rana*
 ✓ *D. lineatus*
 ✓ *A. spiriferoides*
 ✓ *C. recurva*
C. hamiltonensis
Cerolopora
Bryozoa
C. coronatus
Cystodictya

The upper arenaceous shale beds are not only fossiliferous but contain *C. mucronatus* (vicinus)?

At 1314 paces 8' of shales are exposed. These are crumbly and light gray on the surface, dark within. In the first 2 feet of them one may find in abundance *S. granulatus* and *C. rhincronatus* (verrucosus)? and *P. nana*. Less abundant are:-

C. bellistriata
M. concentrica
D. lineatum
A. praecumbona
A. umbonata
R. vanuxemi

Platyceras 2 sp.
B. lida
A. reticularis
Capit. hamiltonensis
C. coronatus
A. spiniferoides

About 6' above stream bed zones & bands of *A. umbonata* can be noted.

At 1400 paces is a large exposure (20' vert.) and in the debris here slabs were found that have *A. praecumbona* (?) in great abundance. Concretions here yield fossils as *R. fimbriata*, *C. coronatus*, *S. pennatus*, *A. reticularis*. In the shales besides these are; *S. granulatus*, cup corals.

At 1456 paces in the stream bed *A. umbonata* is very common. Also here was noted *P. nana*, *A. reticularis*, *A. praecumbona*?, *Streptelasma*.

Between 1700 and 1800 paces the following fauna is recorded

R. vanuxemi 1100

S. granulatus c

A. reticularis c

Streptelasma rectum c

A. praecumbona ? see large slab

A. spiniferoides

Rana c

Pol. fecunda

Capit. ham.

D. sculptilis ?

At 1900 paces the following were seen:-

S. granulatus

S. andaculus

R. vanuxemi

S. pennatus

At 1962 paces the shales break into thin pieces and are a light brownish grey on the surface :-

Fauna :-

O. loddensis var *media* cc
L. laura cc
C. indenta n
A. spiriferoides n
R. praecumbens cc

A zone of this kind was noted under the Coral beds at Fall Brook

At 2064 paces the fauna again becomes like that below. Here we have

<i>S. rectum</i>	<i>A. reticularis</i>	<i>L. stellata</i>
<i>A. spiriferoides</i>	<i>S. granulosa</i>	<i>S. pennatus</i>
Fenestellidae	<i>Cystodictya</i>	<i>C. mucronata</i>
<i>Cyclonema</i> sp.	<i>D. lineatum</i>	<i>S. inaequata</i>
<i>S. andaculus</i>	<i>Eridophyllum</i> ?	<i>R. vanuxemi</i>
<i>R. cyclos</i>		

At 2300 paces in the stream bottom & a foot up the fauna is profuse in small calcareous lenses :-

<i>I. exigua</i>	<i>S. cf. marci</i>
<i>Cystodictya</i>	<i>A. spiriferoides</i> c
<i>S. gima</i> ?	<i>Pleurodictyum</i> ?
<i>S. inaequata</i>	<i>S. granulosa</i>
<i>A. reticularis</i> cc	<i>Orbiculoides</i> sp.
Fenestellidae	<i>Coronites</i> harr.
Crinoida	<i>T. carinatus</i>
<i>D. lineatum</i>	<i>Platyceras</i> sp.
<i>S. pennatus</i>	

2384 paces - same

2600 paces the Genesee is 27' above stream level.

At stream level and 1' above here the following species were found

<i>A. reticularis</i>	<i>S. rectum</i>	<i>R. vanuxemi</i>
<i>I. carinatus</i>	<i>S. andaculus</i>	<i>T. limbata</i>

T. carinatus is not very abundant in these upper beds. These beds have lots of bryozoa in the calcareous bands. At 2764 paces the fauna is the same.

2910 fauna about same but fossils less numerous. Pyrite concretions common here.

At 3052 paces, about 10-15' below the Genesee the following were found

<i>Lingula</i> sp.	<i>Leiopteria</i> sp.
<i>T. submarginata</i>	<i>C. setigerus</i>
<i>L. andaculus</i>	<i>L. tullius</i>
<i>L. minutum?</i>	
<i>C. boothi</i>	

About a foot below were found
L. laura } pyritized. Pyrite concretions
C. scutellus } were abundant here

The Genesee crosses the stream at 3350 paces, 180 paces downstream from the fork in the streams. A pyrite lens of $\frac{1}{2}$ " thickness was noted near here, but they are not common, the Massena being in contact with the Genesee nearly everywhere.

August 3.

The Deep Run shale by "Hand-level" in the Richman Point Ravine is 59' 7" or 60' thick.

Menteth Point (Menteth Manor house) from bridge to base of falls is 255 paces. Falls is 38' high.

Fossils seen in the Karberg shale are:

T. cinnatus c

S. pennatus c

Calymene c

Leptæa sp.

Leptæa sp.

P. rostrata

S. ham.

S. marcyi

O. parvula

Goniophora c

C. scutellus

C. boothii

C. bellistriata

P. lanceolata

S. solusoides

S. ~~ham.~~ arcuata

P. styliformis

A. spiniferoides

0-258 above menteth = about 11' vertical

At 322 paces come thin bands of calcareous shale containing *C. impressa*

Famula of these is *S. pennatus*,

C. impressa c *M. concinna* c *A. spiniferoides* c

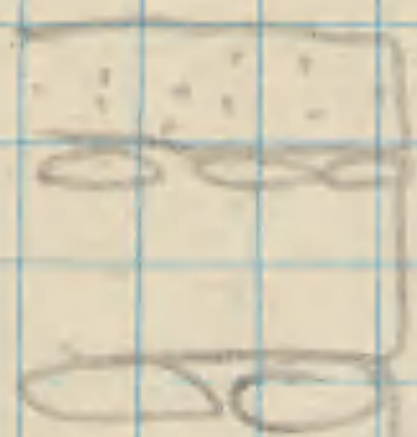
R. vanuxemi c *Favosites* c *A. granulosa* c

A. andacula c *P. styliformis* c *P. lanceolata* c *D. lineata* c

The uppermost of these calcareous beds appears to be about 15' above the Menteth and the *C. impressa*-bearing layers occupy about ~~15~~ 3'.

322-552 same. Here *Centronella* bed forms a 2' cascade at 322 paces.

Kashong shale



3'

2 1/2' shale

concretions

shale 5'

calcareous bed 4''

shale 19' ±

C. impressa

3' of shale & calcareous shale alternations

15'

menttett

At 572 - near base

Par. harr.

Crinoid

Microconchites

Platyceras

S. pennatus

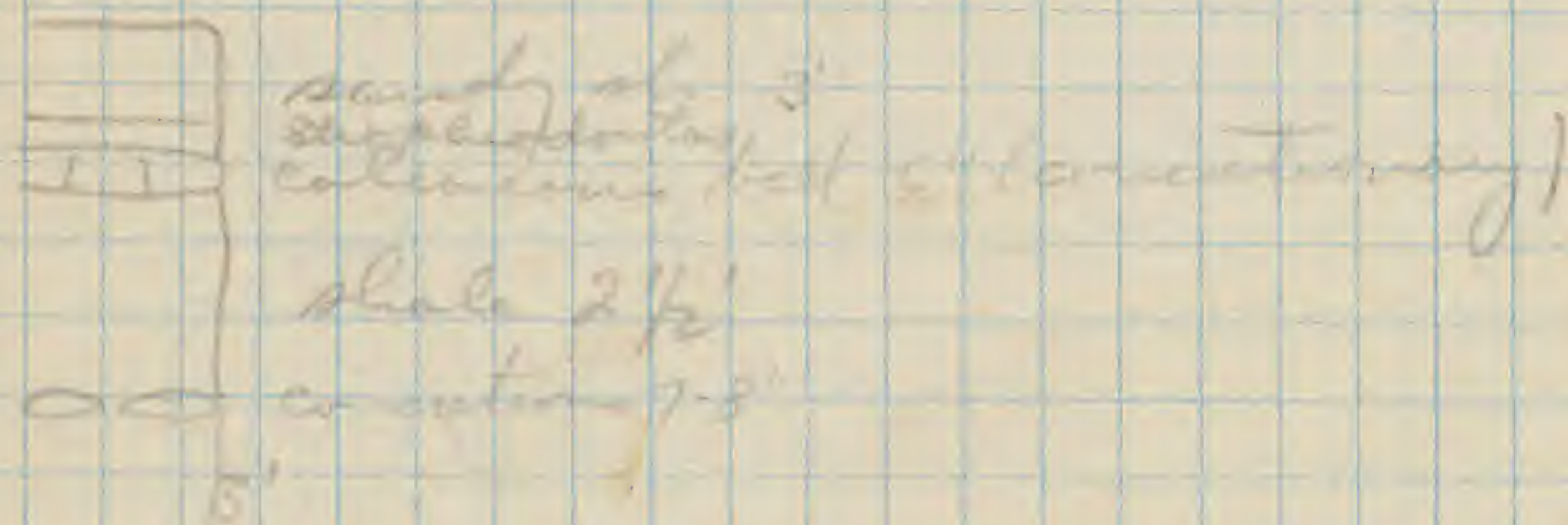
T. carinatus

H. shengji

At 850 - 3' above stria - level - *Microconchites*

At 1119 comes the concretionary bed
Section at concretionary bed

The Keshong shale appears to me to
be a rather typical siltstone



stria

At 1219 passes comes the $1\frac{1}{2}'$ cascade
over the sandy shale which is about
3' thick.

Fossils in the sandy bed are -

C. mucronatus &

G. granulosa

C. virens

Microconchites

G. ignea

Platyceras

P. harr.

T. carinatus

D. lineatum

C. imbricata

P. novae occurs at the base of the
bed in association with *G. ignea*

Cran. harr.

Plus the big *Strophodonta* are most
abundant in the 8' of shale between
the concretionary bed and the upper sand
bed.

16-18' Dark shale.
L. laura

Transitional 3'

35'-45' Atrypa - Spirifer - Cystodictya
zone
42'

L. laura upper 2'

6-8' Or. proem. bona
Dark shale
L. laura

14' Stroph. coralline zone?
light blue grey

20-22'

Ambocoelia beds

3' sandy layer

The shale just above the sandy layer abounds in *A. umbonata*, and *C. mucronatus*. This then is the beginning of the typical Ord-shale just above the sandy layer.

For the first 5' 5" of above the sandy layer the rocks are mostly covered except for about 3' on the sandy bed, but at 1350 paces there is about 18' of shale exposed. This is at about 5-13' above the sandy band. fossils in this shale are:

<i>A. umbonata</i>	<i>L. perplana</i>
<i>P. rana</i>	<i>R. fimbriata</i>
<i>A. granulosa</i>	<i>C. vicinus</i>
<i>S. pennatus</i>	<i>A. spinulosus</i>
<i>C. setigerus</i>	<i>Pholidops</i> how
<i>Tronchus</i>	<i>C. mucronatus</i>

at 1490 - which is 16' above the sandy band *Ambocoelia* still occurs in success. Other fossils here are:-

<i>P. rana</i>	<i>C. sinulus</i>
----------------	-------------------

The *Ambocoelias* are common for fully three feet (19' above sandy layer) above stream level where a layer of concretions occurs. The *Ambocoelias* disappeared between the 3rd & fourth steps, about 15-71 paces. This makes this bed about 20' thick. Fossils in first 5' shale above *Ambocoelia* bed exposures are patchy but the following were seen:

<i>P. rana</i>	<i>Strophomena</i>
<i>Orthis</i> <i>Orthis</i>	<i>C. mucronata</i>
<i>S. inaequistrata</i>	<i>G. reticularis</i>
<i>G. vanuxemi</i>	<i>P. jania</i>
<i>L. perplana</i>	<i>S. perrensa</i>
<i>A. granulosa</i>	
<i>D. sculptilis</i>	

1826 - 1878.

Extensive exposures beginning about 10' above the Ambocoelia beds, Fauna

S. rectum c.

A. reticularis

A. andacula

P. rana

R. vancouverensis

A. spiriferoides

C. vicinus

~~*S. vancouverensis*~~

The beds with *S. rectum* and *R. vancouverensis* continue up to 3' above the 1826th place where the *A. praecumbens* bed comes in about

1878 - ^{Base} Ambocoelia bed is 2' above stream level. The base of *A. praecumbens* bed is about 1' below the top of the 7th step over the sandy beds.

A. praecumbens c.

P. rana c.

A. spiriferoides

S. tullius

A.

The umbonate bed terminates about 3' above stream level at 2013 place. It is this about 7' thick. The shale of this bed is somewhat darker than that below.

~~2013 - 2015~~

2015 some exposures of dark shale with *A. praecumbens*, *L. rana*. These are the upper part of the *A. praecumbens* bed and go below stream at 2124 place and make the *A. praecumbens* bed between 6 and 8' thick probably about 7'.

O. media

A. andacula

$$\begin{array}{r}
 80\ 10 \\
 \hline
 87 \\
 \hline
 84 \\
 44
 \end{array}$$

$$\begin{array}{r}
 212\ 4 \\
 13\ 10 \\
 \hline
 34\ 54
 \end{array}$$

$$\begin{array}{r}
 212\ 4 \\
 13\ 10 \\
 \hline
 34\ 54
 \end{array}$$

The succeeding shale is bluer and abounds in fossils.

A. reticulatus
S. pumilus
R. vanuxemi
P. rana
R. fimbriata
C. incusnata &
 Cinnoid stems
L. junia
A. marci

Par. Hamiltonia
C. bellistriata
A. andacula
L. perplana
D. inaequistrata
C. boothi
A. spiniferoides
P. echinatus
C. coronatus

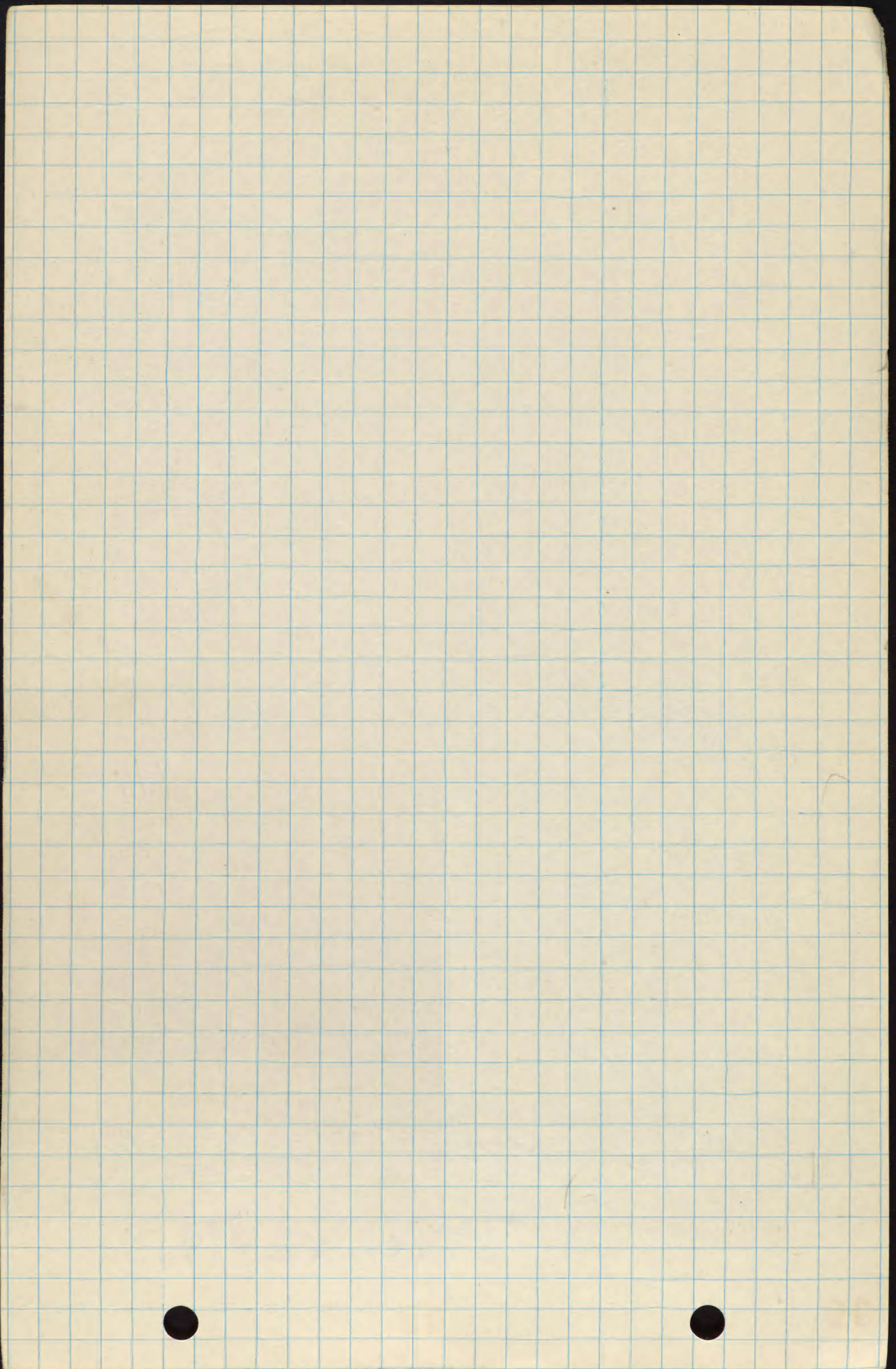
At 2944 the *Atrypa* - *Spinifer* - *Cystodictya* fauna disappears and the becomes darker. This is about half way between the 16 & 17 h.l. steps making for this zone about 40'. The actual change from the bluish calcareous shale to the dark shale comes at about 3069 + 1' above stream, or about 3' below the 18th step and is thus about 42' thick for the *Spinifer* - *Atrypa* zone. The shale of this zone is bluish grey, blue grey, crumbles to small fragments. It contains many concretions and thin calcareous beds abounding in bryozoa. The above fauna gives only the Guilmon elements. *P. echinatus* comes in after about 20'.

The uppermost shale is black and contains *L. lancea* & it is 16-18 feet thick.

L. lancea

The Genesee contact is at 3454.

The black Hamilton can be easily distinguished from the Genesee by a weathering into thin flakes, but in the flat sheets of the Genesee, at



also weathers to a bluish surface. The exact contact can be distinguished by the pyrite. The thickness of the Hamilton and the flat plates of the lower are in striking contrast. These are about 3' of dark shales transitional to the thin beds above, not so crumbly as the upper black shale and is a lighter color.

The Amboceras beds terminate at the concretions 20' above the sandy layer.

The Keshong shale appears to be about 45' thick here.

August 4

Deep Run

At 700 paces from the highway the first outcrop of shale is met. It is about 15' vertical.

At 766 the fauna and rocks can be more closely examined. Here the rock is a soft grey shale weathering to blue grey fragments. Fossils are:-

<i>S. pinnatifida</i>	<i>P. punctilifera</i>
<i>A. umbonata</i>	<i>Ostracoda</i>
<i>C. boathii</i>	<i>S. pennatus</i>
<i>P. grana</i>	
<i>L. laqua</i>	

This fauna continues to 941 paces but the *Leiorhynchus* has apparently dropped out. *Ostracoda* are common. Other fossils are:-

<i>Lox. hamiltoniae</i>	<i>Orthoceras</i> sp.
<i>B. leda</i>	<i>S. truncata</i>
<i>N. triquetra</i> (large)	<i>P. carinatus</i> (very small)
<i>L. lepidus</i>	

962 paces

<i>A. spiniferoides</i>	<i>R. stolonifera</i>
<i>N. lirata</i>	<i>D. subulatum</i>
<i>H. capillaria</i>	

986 paces - large *Spinifers* are very common as also:-

A. spiniferoides
S. pennatus

Other fossils are *Conularia undulata*, *Cras. hamiltoniae*, *P. carinatus*, *S. andaculus*, *A. depressa*, *A. princeps*? The *Spinifer pennatus* here are of very large size, larger than at any other horizon. This was also noted at the Lake Shore

Between 1000 and 1031 paces the following species are recorded:-

Favosites sp.

D. lineatum

Platyceras sp.

Pal. Chamettoniae

C. vicinus

S. perplana

D. carinatus

Pal. ~~constriata~~

M. concentrica

✓ R. fimbriata

Goniophora cf. arcuata

✓ C. coronatus

at 1031 paces C. vicinus literally swarms in the rocks. Here also are large specimens of D. carinatus of the transversal variety. At 1031 paces is a steep fall extending back 50 ft or more. Here the level is used.

Fossils noted in the first 5'

N. Triquetra

✓ S. perplatus

Platyceras sp.

S. jenia ?

B. leda

✓ A. spiriferoides

S. andaculus ?

Pal. fecunda

P. rana

✓ D. carinatus

✓ S. perplana

C. bellistriata

✓ Favosites sp.

✓ S. inaequistrata

✓ C. coronatus

Pal. constriata

The Tichenor occurs just 16' above the 1031 step. Other fossils found below are

✓ P. pavilionensis

✓ N. concinna

✓ Cap corals

✓ D. lineatum

✓ J. limbata

✓ C. mucronatus

✓ R. banyensis

✓ Goniophora sp.

✓ E. lucina

✓ C. indenta

✓ Lichenalia

This exposure is not unlike that at Wheeler Gully where bands of ls made up mostly of fossils & crinoid stems form cascades. Here there is a prominent band about 2" thick $2\frac{1}{2}'$ below the Tichenor. Other bands are less prominent and have less effect on the contour of the stream. The profuse assemblage of corals in the upper band is not noted here. Corals are few, and were met

first, that is cup corals, about 10' below the Tichenor.

Tichenor ls.

About 13" thick in the face of the falls. *A. spiriferoides* was noted in it.

The interval in the fall represents 27 paces.

Moscow

The rock on the Tichenor is hard, almost a ls. but is admixed with considerable shale, and the lowest 2' fossils are difficult to extract but the following were seen.

<i>P. cf. robbi</i>	<i>D. lineatum</i>
<i>P. rana</i>	<i>R. fimbriata</i>
<i>Cyst. hamiltonensis</i>	<i>P. undosus</i>
<i>C. subcrescitum</i>	<i>C. prolifica?</i>

96 paces above the Tich. On some exceedingly hard shale, a softer stone yielded the following

<i>B. boydi?</i>	<i>D. hamiltonensis</i>
<i>M. concentrica</i>	

161 paces

✓ <i>P. rana</i>	✓ <i>S. ellipticus</i>
✓ <i>Par. hamiltoniae</i>	✓ <i>D. parvula</i>
✓ <i>J. carinatus</i>	✓ <i>C. boothi</i> } 229

236 paces

✓ <i>C. recurva</i>	<i>C. sumerostus</i>
<i>S. andaculus</i>	✓ <i>C. coronatus</i>
✓ <i>P. princeps</i>	✓ <i>Par. hamiltoniae</i>
✓ <i>C. planicostus</i>	<i>Canarotocchia</i> sp.
✓ <i>P. rana</i>	✓ <i>C. boothi</i>
✓ <i>J. carinatus</i>	<i>C. vicinus</i>
✓ <i>S. arcuata</i>	✓ <i>P. patulus</i>

269 Paces

<i>A. arctum</i>	<i>D. lineatum</i>
------------------	--------------------

1.97
5
990

At 458 paces is a large cascade representing about 20 paces horizontally.

Fossils here

C. brothi

C. coronatus

S. pennatus

D. lineatum cc.

Crinoides

At the top of this cascade is the ~~sub~~ Menteth ls. The cascade is 43' 4" high. The Menteth is 10-11" thick. Fossils noted in the shales below are

Pal. constricta

C. brothi

S. armatus

C. scitulus

Fossils seen in the Menteth are:—

A. princeps

S. pennatus

R. vanuxemi

S. andaculus

P. rana ✓

S. perplana

Ostracodes ✓

✓ *H. deliazi*

I. carinatus

✓ *M. constricta*

The stone here contains much shale and is therefore quite nodular on the surface.

In the Menteth come crumbly shales with large & abundant *I. carinatus*. This was followed for 250 paces.

Tully ls.

2' 8" thick consists of a lower bed 2' 4" thick and an upper one 4" thick. In the lower part of the main portion the rock crumbles easily to fragments. It is blue grey on the fracture section. It is located just south of the roadway. When the Moscow shale has been weathered away it exposes the under surface of the Tully and on this under surface were found several examples of *H. cuboides*.

In the ls. there is considerable pyrite in the lower bed, as is in the lower bed in Madison Co. The thickness of the upper thin layer varies from 4-6". This layer also contains *Hypothyris* abundantly.

The strata below the gully break into very thin flakes and have few fossils. The gully with this exposure is on the west side of the road about 75 yds south of D. M. Voorhees residence. Voorhees is son-in-law of Meritt Cole mentioned in the report. This ravine has 3 names Gage, Elliott and Hall gully, now called the Hall gully.

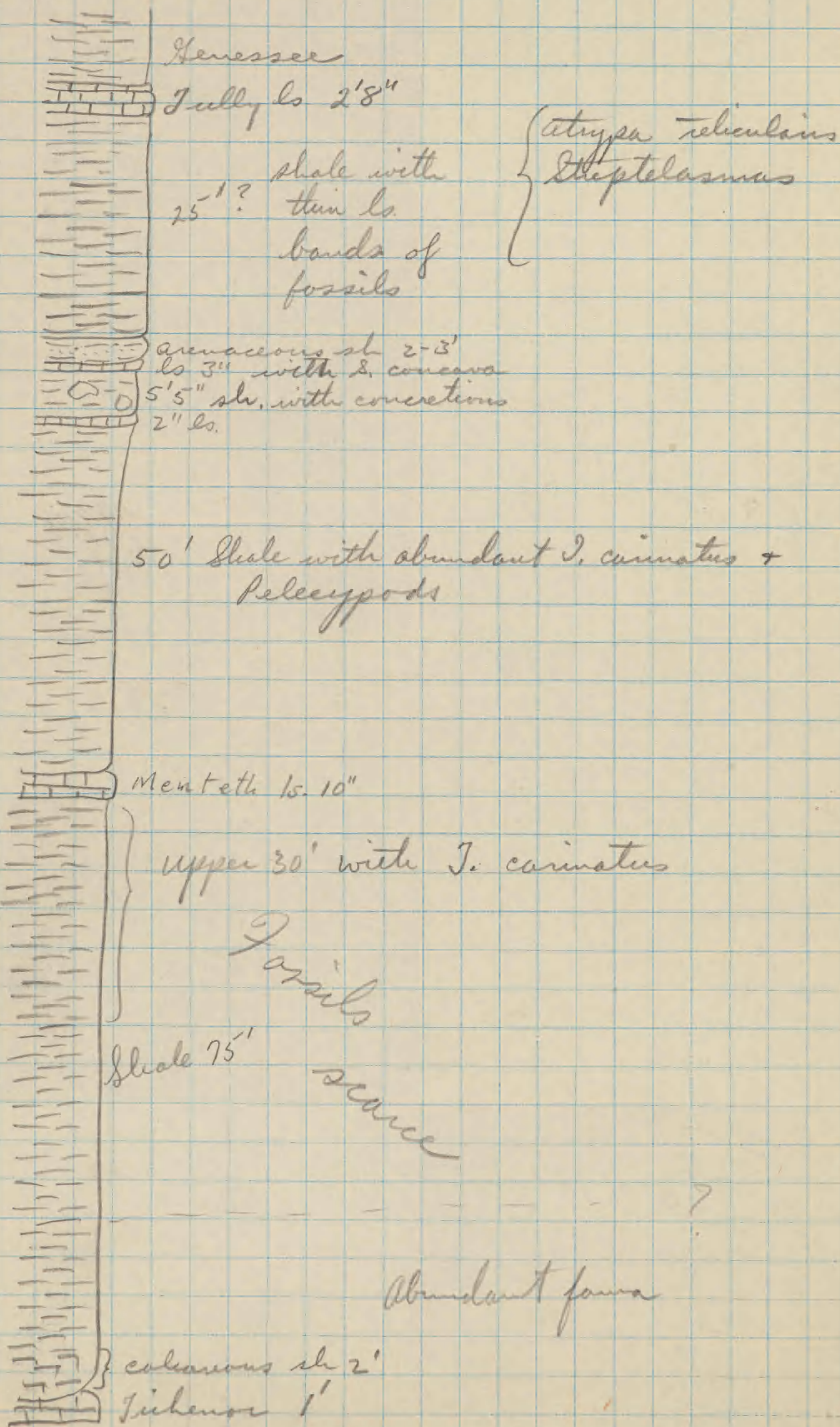
Gage (Hall) Creek Ravine

Traversed in company of Mr. Hall. Here essentially the same sequence was seen as in the other ravines. The Tichenor lies at the bottom about 50 yards east of the road. Luther's map does not have the Tichenor cross the road. About one quarter of a mile above the Tichenor the Menteth ls. mounts a 25 foot cascade. The Menteth here is nodular, with some shale. On Luther's report a mention of a series of nodular ls. crossing the stream at 50' above the Menteth was verified (not the height). The section here is as follows

2'	arenaceous sh.
3"	<i>Stropheodonta concava</i> ls.
5' 5"	sh. with grotesque concretions
2"	ls.
	sh.

In the concretions were noted pleuralae of *H. delavayi*, and *S. pennatus*. Above the *S. concava* ls. came an arenaceous shale for about 2'.

A hypothetical section of the Moscow follows.



August 4, 1928

Sage Creek

Lichenor is 66 paces upstream from highway.
Fossils observed in the lower 2' of the Deep Run shale
are:

P. rana large
Corals
Crinoids

P. pavilionensis
D. lineatum

I make the Deep Run shale 55' thick by hand-
level. 35' were leveled to the Menteth in a
small side gully 243 paces upstream.
from Lichenor

300 paces is a calcareous lens in Deep Run
containing

M. concentrica
P. oviformis
Platyceras
T. carinatus

P. rowi
T. exigua
M. maculenta (?)

At 660 paces comes a 25 foot fall capped
by the Menteth.

Fossils observed in the Menteth 8"-1" thick
are:

C. coronatus
S. pennatus
S. sculptilis
A. princeps
Orthoceras sp.
T. carinatus
C. planirostris

C. boothi
C. scintillus
P. rana
S. perversa
A. andacula
R. vanuxemi

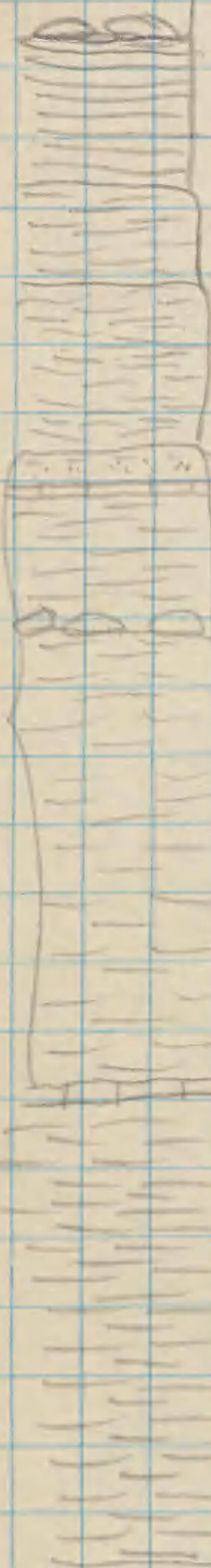
Section on Gage Creek



Dully ls.

13 1/2' dark shale

~~13 1/2'~~ 33'



A. praecumbens 7 1/2' - 8'

D. concoloratus beds 8' - 10'

22' Amboceras beds

40' Kachong shale

Menteth ls. 8' - 1'

Deep Run shale 55'

Lichenor

13 1/2'
33'
51'

75
4
79

1000
225 1/2
775
60%

78 1/2

95
26
113

The Menteth is hard, nodular, in places shaly, blue-grey and abounds in *Daonurus* markings.

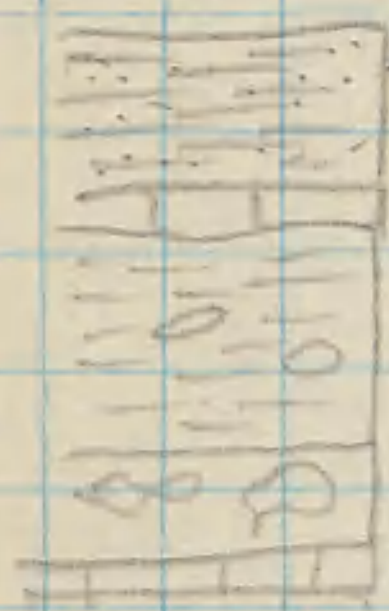
Kashong shale.

A. erectum seen.

At 575 the concretionary ledge is exposed and by land-level it rises 33' to the bottom of it. Fossils in the concretionary layer are

I. carinatus
Section at concretionary bed.

E. acutatus
S. junius
S. media
S. gemmatus
S. perplana
Pholadopsis
E. linchilarii
S. marcyi
P. rana
S. circularis
Aviculopecten



sandy shale 3'

5' shale with concretions

shale with grotesquely shaped concretions 1'

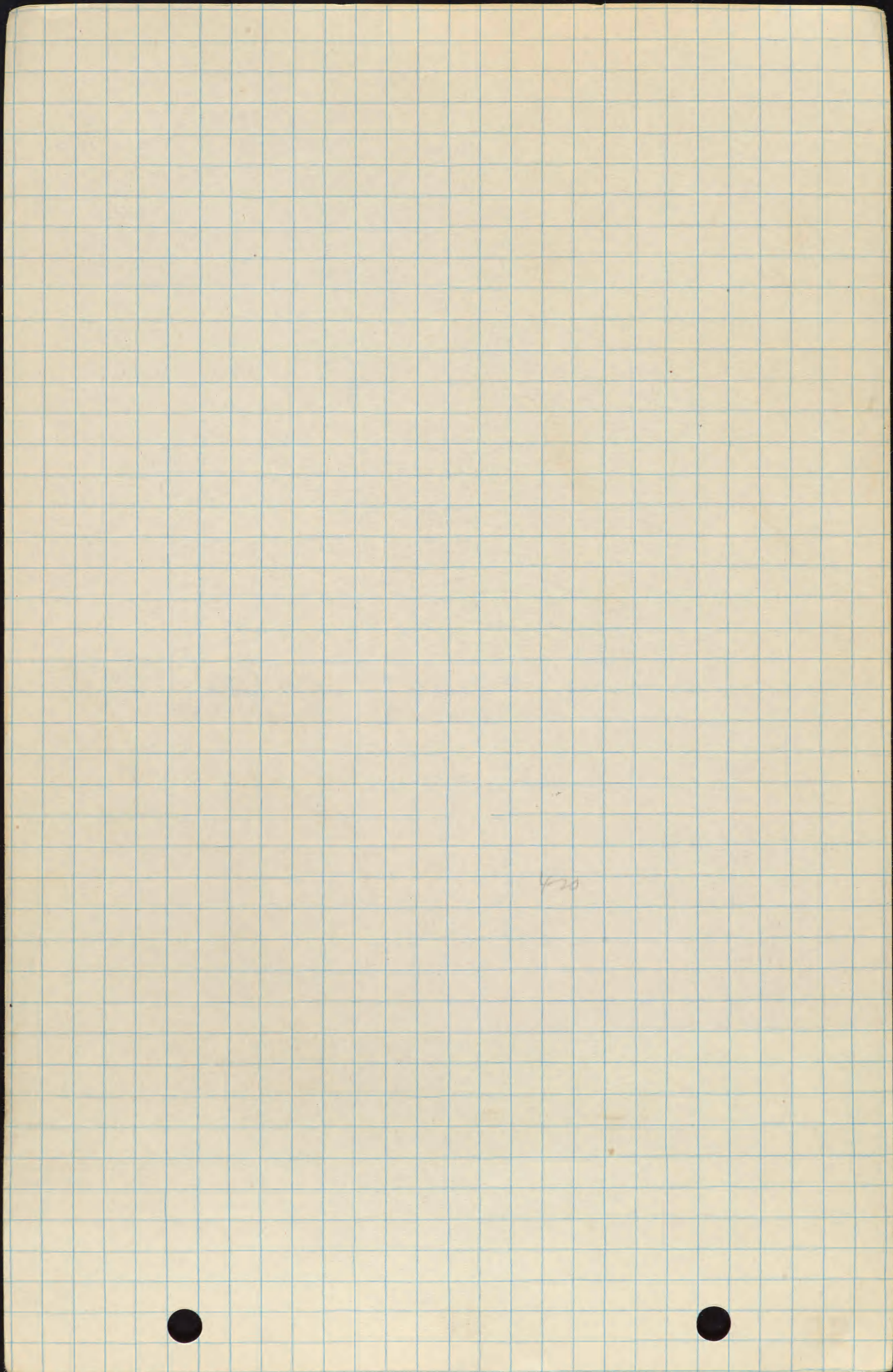
5" calcareous bed

33'
shale

Fossils in the shale above the concretions are:

I. carinatus

At 600 paces above the Menteth is a 7' cascade with the concretionary bed at the bottom. Feet of shale above it. Then a 2-4" calcareous-arenaceous ledge and about 3' of sandy shale above it.



Fossils of the Kashong shale

T. carinatus
C. coronatus
A. erectum
S. pinnatus

O. undulata
Pal. constriata
S. angulatus
G. arcuata

in the 2-4" ledge occur:

L. perplana

S. pinnatus

C. mucronatus

Ovid shale = Windom

All Ovid pages referred above the sandy bed. The ~~sandy bed~~ shale at about 25 paces upstream from the falls. ~~has the top of it~~ abounds in *C. mucronatus* in abundance also *A. umbonata*, *P. rana*, *S. pinnatus*, *T. carinatus*. It is an arenaceous shale transitional to the sandy bed below. 150 paces above the hard layer (10') the shale abounds in *A. umbonata*, and has also:

S. pinnatus

A. spiniferoides

At 290 paces *A. umbonata* is in force. Other fossils are

P. rana

Pal. constriata

C. lepidus

C. bellistriata

M. pyramis

C. setigerus

Pholidops (ham)

P. tenuis

360 paces comes the top of the *Ambocelia* beds at about the intersection of the two streams. This intersection is 20' above the sandy bed.

32

360-520 - represent 4th - 5th H.R. steps
A. reticulatus c
D. consobrinus re
S. rectus re
J. exigua r
G. granulosa r
P. rana re
F. stellatus c
D. consobrinus was seen right at 520

520-583 — 5th - 6th steps — The *D. consobrinus* beds continue to 583 where the *A. praecumbens* bed comes in about 2' below the top of the 6th step. Thus the *A. praecumbens* bed here is about 30' above the sandy layer, making the *D. consobrinus* beds about 8-10' thick.

The *A. praecumbens* beds have the following fossils.

<i>A. praecumbens</i> c	<i>P. rana</i>
<i>A. umbonata</i> a	<i>A. andacula</i>
<i>S. tellus</i>	<i>L. rana</i>

The shale of the *A. praecumbens* beds is rather more fissile and much darker than that below, nothing else the same in places.

At the top of the 7th step, ^{2' above the *A. praecumbens*} is a layer of ~~concretionary~~ ~~and this seems to terminate~~ the *A. praecumbens* beds. The concretionary layer is at 680 in the stream bed. Fossils in the *Spirifer* - *Orthis* beds are:

$$\begin{array}{r} 22 \\ 16 \\ \hline 58 \\ 13 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 78 \\ 57 \\ \hline 14 + 2\frac{1}{2} \\ 5 \\ \hline 76 - 70 \\ 2\frac{1}{2} \\ \hline 78\frac{1}{2} \end{array}$$

$$\begin{array}{r} 112 \mid 5280 \\ \underline{488} \\ 420 \\ \underline{328} \end{array}$$

$$\begin{array}{r} 142 \\ 20 \\ \hline \end{array}$$

$$(37)$$

$$\begin{array}{r} 37\frac{1}{2} \\ \hline 16 \\ 152 \\ \hline 208 \end{array}$$

$$\begin{array}{r} 71 \mid 5280 \\ \underline{497} \\ 310 \\ \underline{284} \\ 250 \end{array}$$

$$(74)$$

$$\begin{array}{r} 1073 \\ 1002 \\ \hline 71 \end{array}$$

$$\begin{array}{r} 13\frac{1}{2} \\ 7 \\ \hline 6\frac{1}{2} \end{array} \rightarrow 71'$$

$$\begin{array}{r} 84 \\ 6\frac{1}{2} \\ \hline 37 \\ \underline{424} \\ 461 \end{array}$$

A. reticularis

A. andacula

S. giria

D. inaequistrata

Pterinopecten sp.

R. vanuxemi

S. pennatus

It is 1073 paces to the falls over the
gully which is 7' high. Fossils in the
upper black shales of the Hamilton are

L. laurus

S. mentum

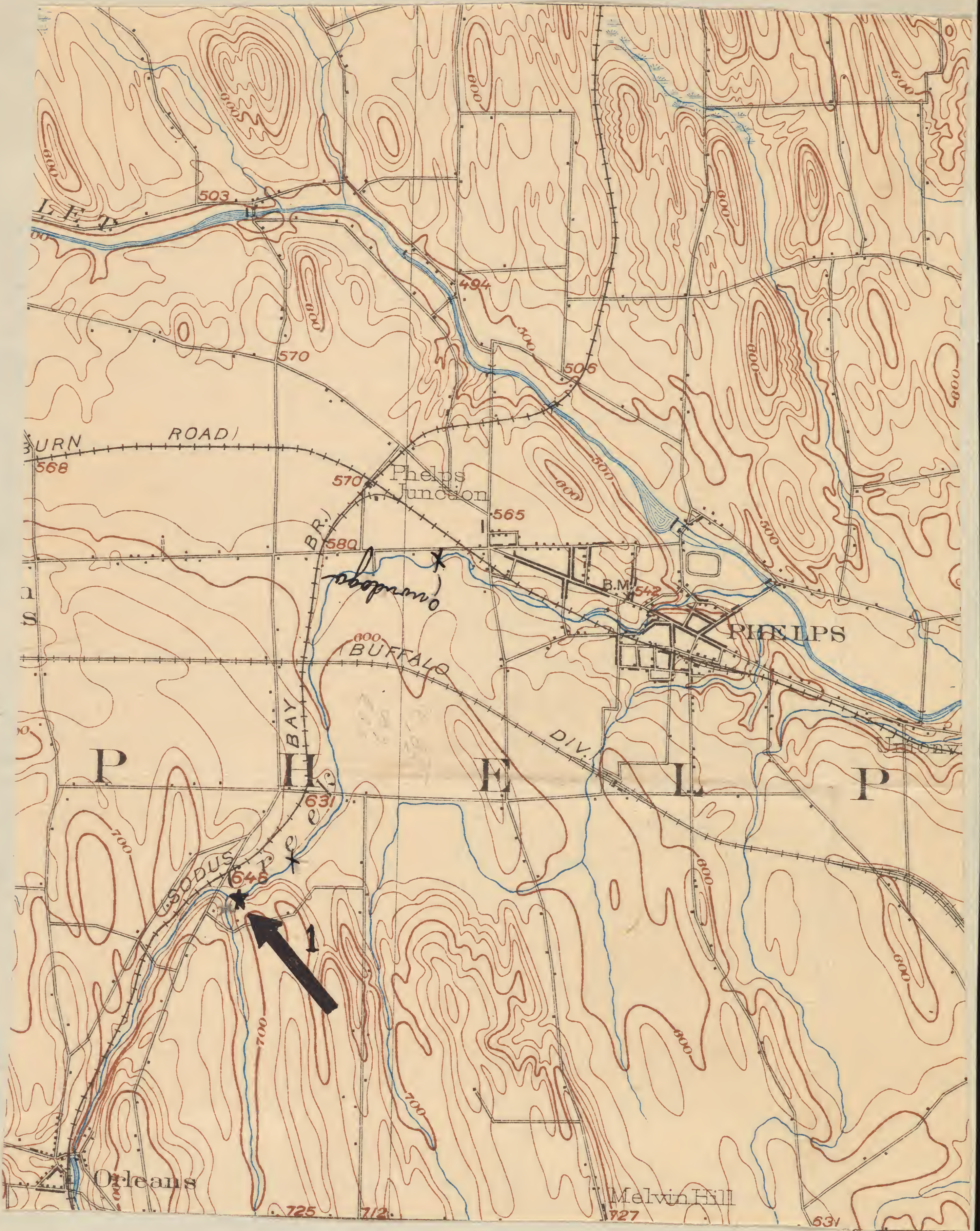
C. lepidus

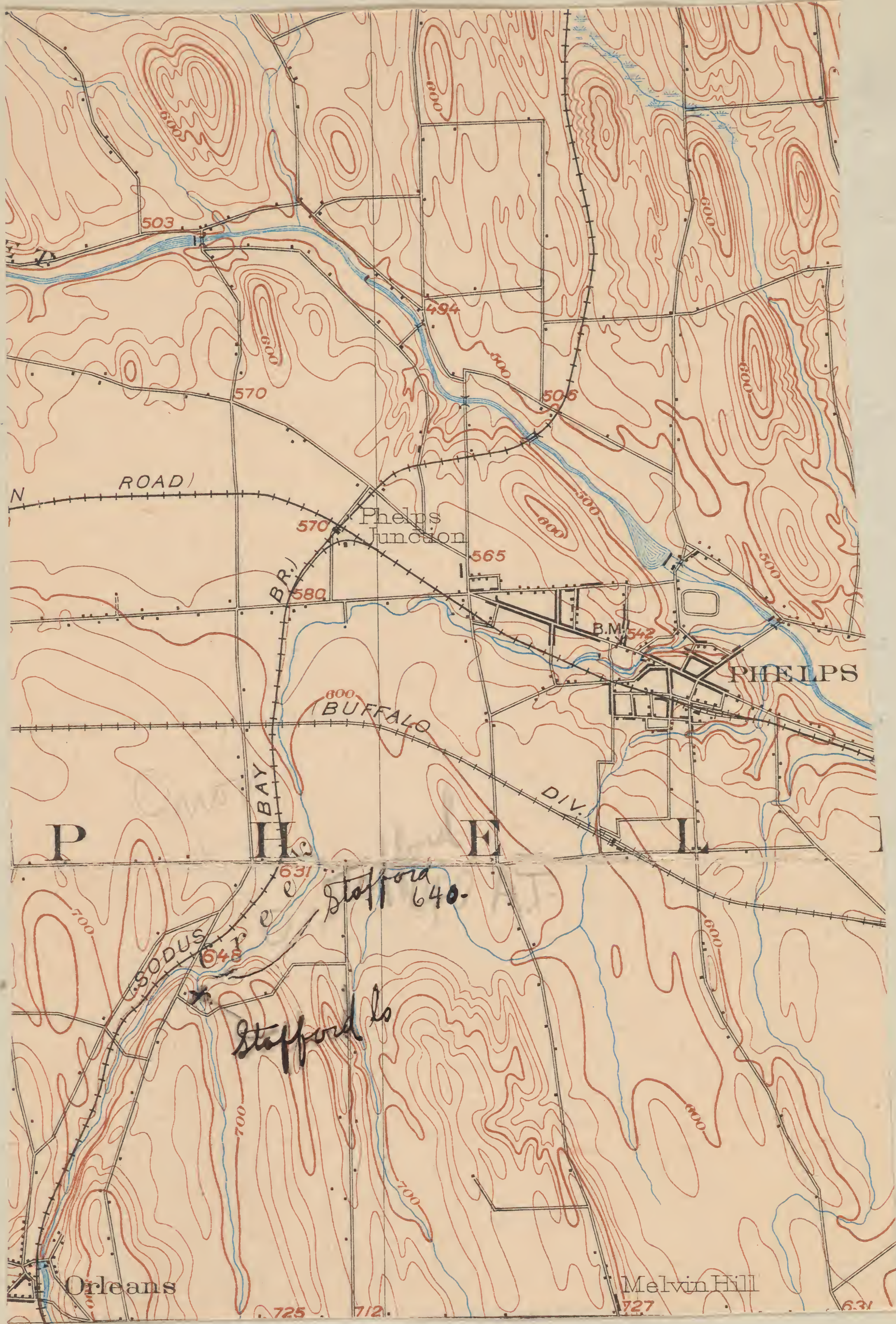
H. corbuleformis

The gully dips $6\frac{1}{2}'$ in 71 paces or $162'$ amounting
to about 1208' upstream. This dip may account
for the discrepancy in the thickness of the
Otrype - Spirifer zone which terminated at
1002 paces. On a recheck this zone is 33'

The *L. laurus* of the *A. praemorsa* zone
are most common in the upper half
of the zone.

68a

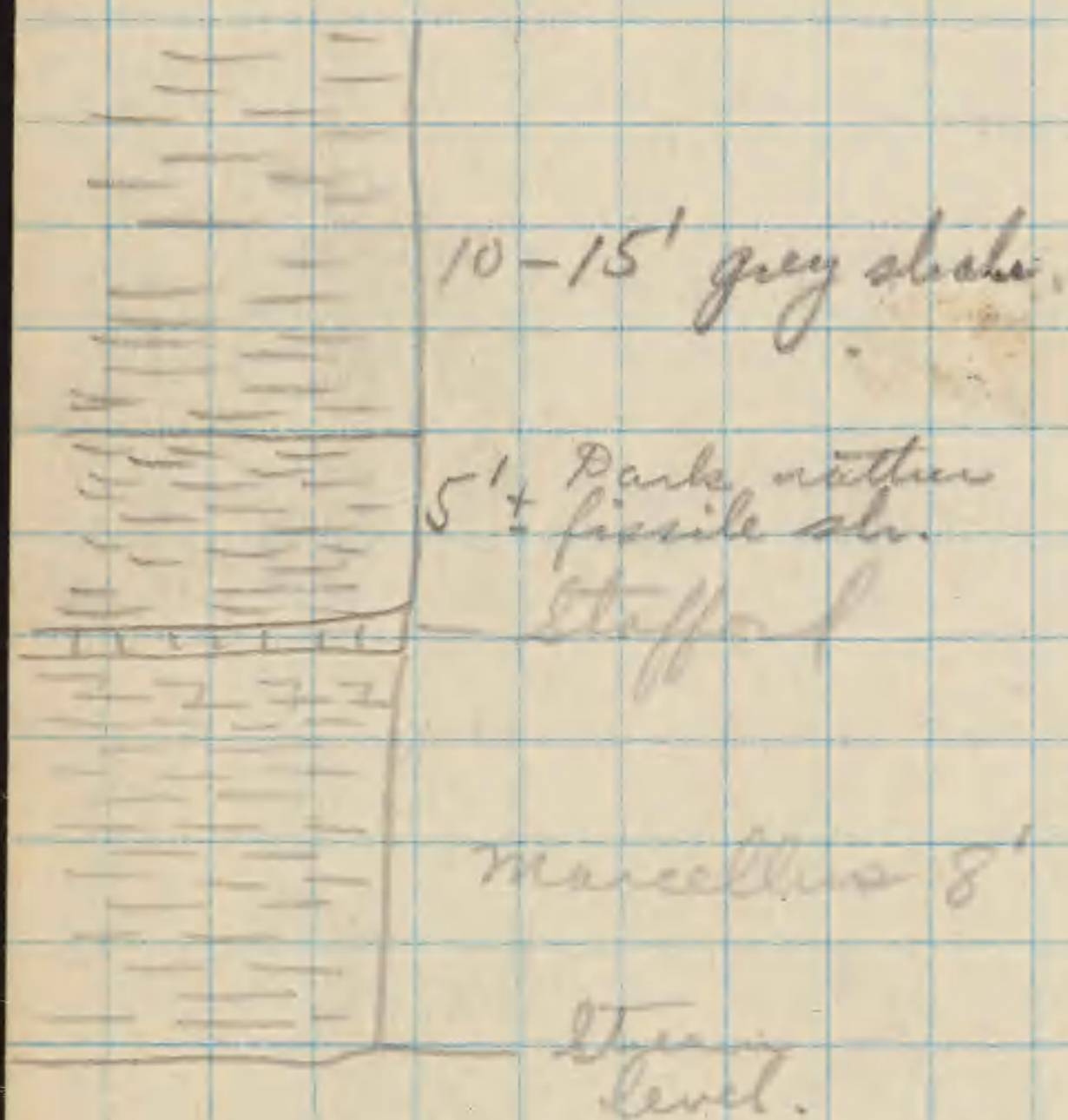




August 6.

Section on Flint Creek east of highway bridge, 2 miles SW of Phelps. Here 275' of shale east of the highway bridge can be found 8' of the Marcellus shales overlain by the Stafford ls. and this in turn by about 20' of Cardiff shale. The lowest 15' of Marcellus is quite unfossiliferous but immediately below the Stafford the black shale is crumpled with fossils.

Marcellus



The lower shales where overlain by the brook are compact and break with curved fractures or into flat plates. These compact layers exist for about 2', then the shales are fissile and break into paper thin flakes. In the compact beds there are tiny grains of pyrite. The following species are recorded from the upper 2' of the Marcellus.

Panzeria sp.
S. fissurella c
A. umbonata

L. limitaris cc
P. fragilis

In the foot of shale immediately below the Stafford, it is calcareous and there are swarms of fossils, mostly *Ambocoelia* and *S. truncata*.

Stafford ls.

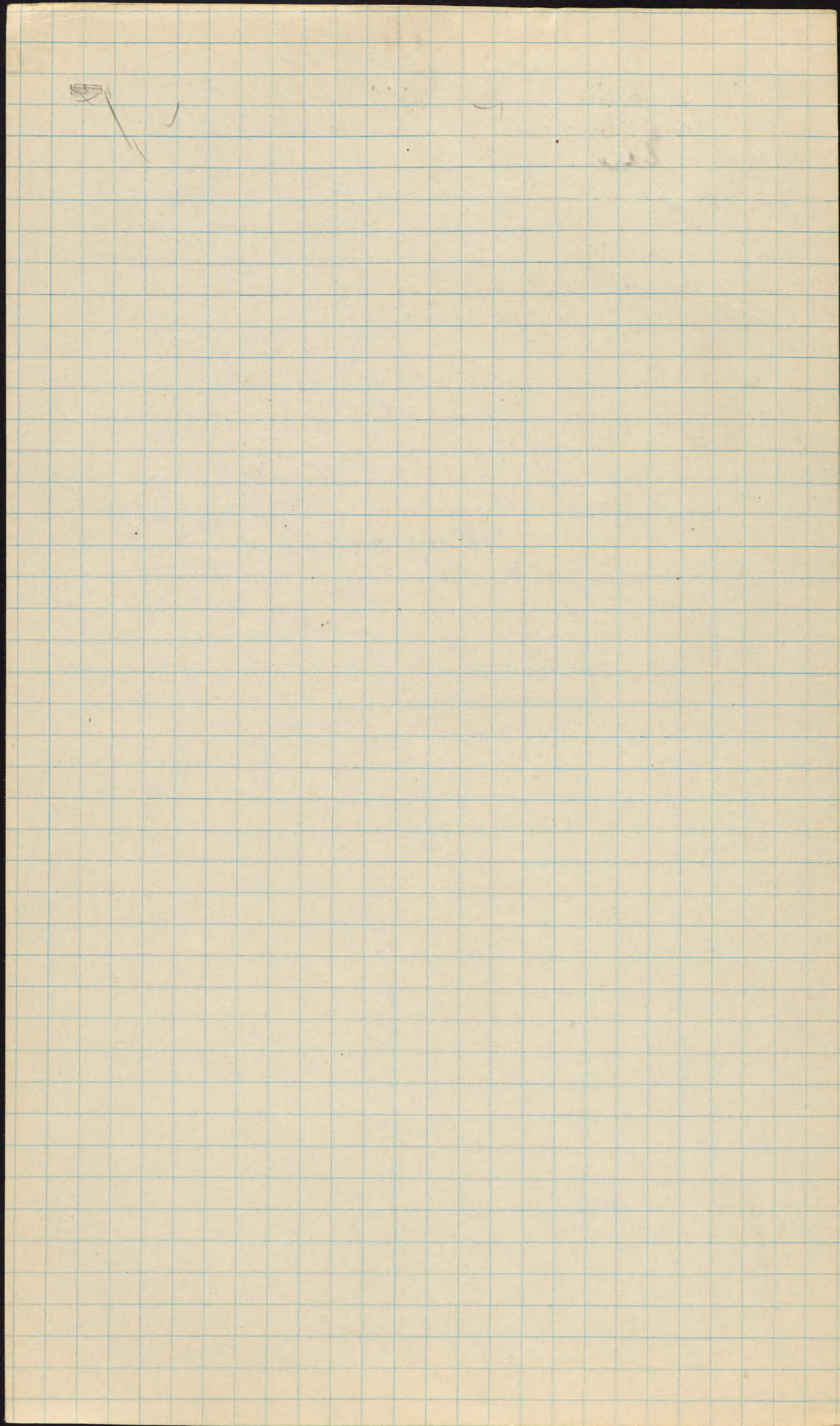
About 6"-8" thick a compact hard ls. standing out prominently from the shales. Immediately below it are fossiliferous Marcellus shales. In section the Stafford is a rather light, blue-grey but it weathers to a tan grey or grey on the surface and brown on the interior. The stone when weathered crumbles readily particularly that on the under side. When fresh it is resistant to the hammer. The rock is very fossiliferous, but the fossils are not as abundant or fine as those from the Stafford at Stafford, N.Y. Snails are very common in the fauna but are only well preserved in the shaley portion of the rock.

Fauna

- | | |
|---------------------------|--------------------------|
| ✓ <i>P. rana</i> c | <i>B. leda</i> |
| <i>A. boothi</i> | <i>C. mucronatus</i> c |
| <i>Conarostrechia</i> sp. | <i>Trogonema</i> sp. |
| <i>B. sulcomarginata</i> | ✓ <i>G. capillaria</i> c |
| <i>P. spinulicosta</i> | <i>Orthoceras</i> sp. |
| ✓ <i>G. subulatum</i> c | <i>L. limitare</i> re |
| <i>Ambocoelia</i> sp. | <i>M. barisi</i> n |

Cardiff.

On the Stafford are about 5 or 6' of fissile, crumbly shales that split into thin flat flakes. These shales are blue black in color and thus lighter than the Marcellus. They give a decided effervescence with HCl. On these are shales that are dark blue grey and weather to an ashen grey. They are not as fissile as those below and crumble into heavier fragments.



These also give effervescence with acid. No fossils were found in the Cardiff here.

Just downstream a very short distance from the bridge another small brook enters Flint Creek. This shows the same sections as above. It enters the main creek over a bed of closely jointed, unfossiliferous Marcellus shales. A short distance below the east highway which this small brook flows under the Stafford is exposed, as are the fossiliferous Marcellus beds. About 2' below the Stafford *L. limitare* is very abundant, but just under the Stafford *Strophalosia* are most common. Here a slab of ls was found among other Stafford slabs, which contain large coiled nautiloids. The Stafford here is from 4-6" in thickness.

Aug 6.
Flint Creek

Below the Cherry Valley a number of layers of dark grey ls. $\frac{1}{2}$ " - 1" thick separated by black shale. Surface of ls. rounded and pitted, shale undulating with irregularities in the ls. Surface strongly pitted by solution

Cherry Valley - dark grey, oily odor, crumbly, to irregular lumps. The Cherry Valley is 725 paces downstream from bridge. In small creek near bridge the Stafford is at about 650' A.T. The Agostinites is at about 620 A.T. making the Marcellus ~~about~~ shale 30' with about 10' for the Cherry Valley & ls. below.

The Stafford was measured at 6". Above it are 6-8' of black shale like the Marcellus. Then the shale becomes bluer and sparser. There is about 25' of it exposed along the banks of the small stream to the bridge.

Fall Brook
3 miles ESE of Canandaigua, N.Y.

058 - covered
58 - dark, nearly black shale in stream bed.

58 - 100 - covered

100 - 135 - 1' vertical of black fissile shale, barren of fossils. The resemblance of this rock to the Marcellus is very striking.

135 - 400 - mostly covered

400 - 430 - bank of black, much jointed fissile shale. A *Leptæolites* much like *L. hunteri* is very abundant.

430 - 480 - covered

480 - 504 - same shale

504 - 536 - covered

536 - 575 - same shale

575 - 600 - covered

600 - 612 - same shale

612 - 672 - covered

672 - 720

T. acuminatus (small) a
fossil

Leptæolites

At 720 and 3' above stream level is a layer of concretions containing *S. truncata* and just above them there is a change in lithology and have seen the *Ammonoites* *Planorbistegus* beds.

The concretionary bed with *Strophalosia* is in the bed at 791 paces. In the shale holding the concretions were:

S. subulatum

S. truncata

Pal. constata

791-820 covered

820 - calcareous hard shale with a few corals: *S. unguis*

820-861 - mostly covered

861 -

A. granulosa

L. pinnatus

B. leda

T. cuneatus

A. umbonata

P. iowensis

A. spirocoides

Pal. emarginata

C. boothi

M. concentrica

A. umbonata

L. bellistriata

Conantoflocina sp.

L. perflava

S. betham

T. omnes

P. rana

Aviculoposter

P. flabellum

The *Pleurothyris* bed is about 7' thick and terminates about 3' above stream level at 882 paces. The shale above it is fissile and crumbles to small flakes.

882-926 covered

926-940 at stream level is a poorly defined layer of calcareous shale about 6" thick. It is separated from an upper layer by about 10 inches of shale.

The lower calcareous layer contains:

A. umbonata

S. pinnatus

P. constricta

A. capillana

L. rectum

S. minutum

P. rana

C. lothi

The upper bed is about 8' thick. The two form well-defined ledges along the side of the stream. Fossils are rare in the upper bed:-

L. rana

P. constricta

B. ledac

M. oblongatus

940-1000 - covered

1000-1142

Soft fissile shale containing *A. umbonata* but fossils rare. This shale is like the bedrock but not so black.

1142-1157 - crumbly shale

B. ledac

1216 - Exposures are now mainly continuous.

1324-

S. pinnatus

L. rana

1400-

L. rana

1425-1454 - about 4' of rock contains the following

<i>A. umbonata</i> c	<i>B. leda</i>
<i>L. laura</i>	<i>P. rana</i>
<i>C. boathi</i>	<i>C. setigerus</i>
<i>C. scitulus</i>	<i>S. pennatus</i>

at 1625 the land-level can be used 12' 5" -

<i>A. umbonata</i> c	<i>S. pennatus</i>
<i>L. laura</i> c	<i>P. rana</i>
	<i>C. setigerus</i>

About 2' below the top of this first H.L. step comes:

<i>S. pennatus</i> c	<i>P. rana</i> c
<i>A. umbonata</i>	<i>A. spiniferoides</i> ²
<i>C. scitulus</i>	<i>C. boathi</i>
<i>P. fragilis</i>	<i>L. densa</i>
<i>C. belbistrata</i>	<i>L. perplana</i>
<i>Pal. constructa</i>	

The appearance of *Atthis* apparently marks the disappearance of *L. laura* and *A. umbonata*.

2nd 5' 5" (185 paces) - 1712 paces brings the edge of the falls. The 2nd H.L. step is about 12' up in the falls. Fossils in the 2nd step are:-

<i>Ambocoelia</i> small	<i>N. triquetra</i>
<i>P. stylioporum</i>	<i>A. spiniferoides</i>
<i>A. abalacella</i>	<i>S. pennatus</i>
<i>A. macronota</i>	Gray. Ham.
<i>N. lirata</i>	<i>E. lucina</i>
<i>N. varicosa</i>	<i>T. carinatus</i>
Lox. Ham. in concretion	

3rd 5' 15" —

D. constricta

S. pennatus

4th Step:—

D. inaequistrata

D. fimbriata

C. inaequistrata

M. barisci

Cyrt. lam.

~~R. for~~ *C. inaequistrata*

R. vancouverensis

C. boothii

J. gibbosa

A. macronota

P. rana

S. pennatus

M. concentrica

D. lineatum

P. oviformis

P. pavilionensis

5th Step.

P. lirsuta

Favosites

A. andacuba

D. inaequistrata

P. gibbosa

Cylindropoecilia sp.

S. pennatus

L. perplane

R. vancouverensis

Cup coral

S. pumila

A. macronota

6th Step.

D. inaequistrata

Platyceras

P. pavilionensis

D. lineatum

7th step same

The Tichenor is about 895' A.T. and is 10" thick. The falls is 35' high

August 5.

Fossils taken from the upper beds of the Ludlowville at Tichenor Point.

- | | |
|-----------------------------|------------------------------|
| ✓ <i>P. brisuta</i> | ✓ <i>S. junia</i> |
| <i>P. macrocephalus</i> | ✓ <i>C. scitatus</i> |
| ✓ <i>P. pavilionensis</i> c | <i>M. concentrica</i> |
| <i>P. rana</i> | <i>A. princeps</i> |
| <i>C. boothi</i> | ✓ <i>R. fimbriata</i> |
| ✓ <i>A. reticularis</i> | * <i>Ceratopora jacksoni</i> |
| ✓ <i>M. haskinisi</i> | ✓ <i>T. exigua</i> |
| <i>Lichenalia celtata</i> | <i>Ambolseia</i> sp. |
| <i>C. indenta</i> | ✓ <i>S. perplana</i> |
| <i>D. lineatum</i> | <i>Archlopecten</i> 2 sp. |
| <i>Platyceras</i> 2 sp. | ✓ <i>C. coronatus</i> |
| ✓ <i>S. inequata</i> | |

Shaffer Crk was traversed from the outcrop I believed to be Centerville ls. down to the blue grey shales with *L. curtum* and *L. limitare* but no intervening rock was discovered. This creek was also traversed upstream from the coral reef exposure but no additional beds were found. Perhaps the ingame limestone are those which occur 2 or 3 hundred yards above the railroad, but these contained no corals. The only beds containing corals noted on this creek were those collected Tuesday, Aug 2.

As far as I can make out, the middle beds of the Ludlowville (Canandaigua) do not outcrop here, or if they do they are not accessible.

[illegible]

Canandaigua 1928

August 2

Creek Running to Reed Corners.

0-1150 - covered

First exposure seen 1150 paces upstream
 patch of shale about 25' horizontally
 and 2' vertically, blue gray
Cybellinaria *R. fimbriata*
D. inaequitrata

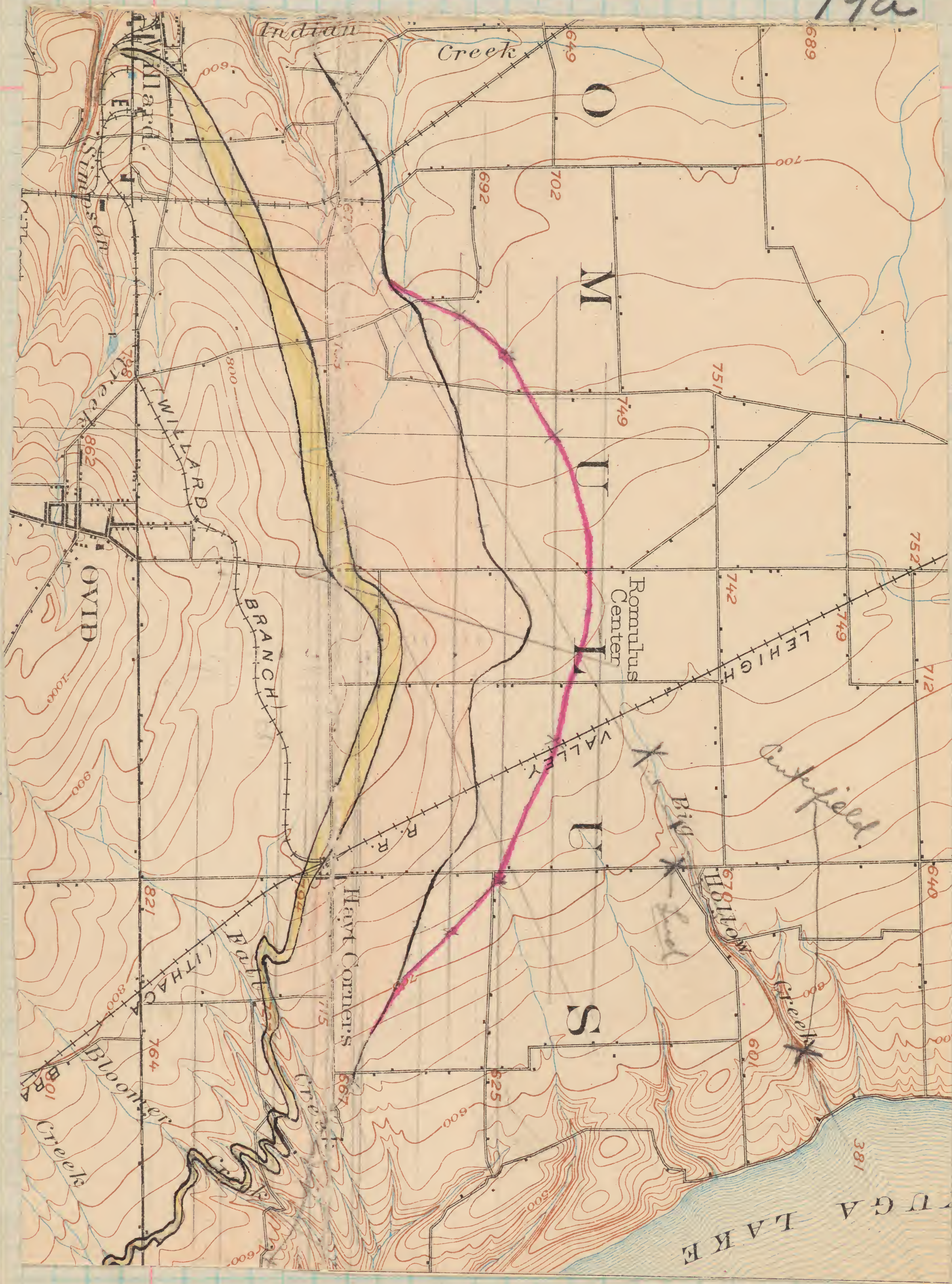
1150-1235 - covered

1235 -

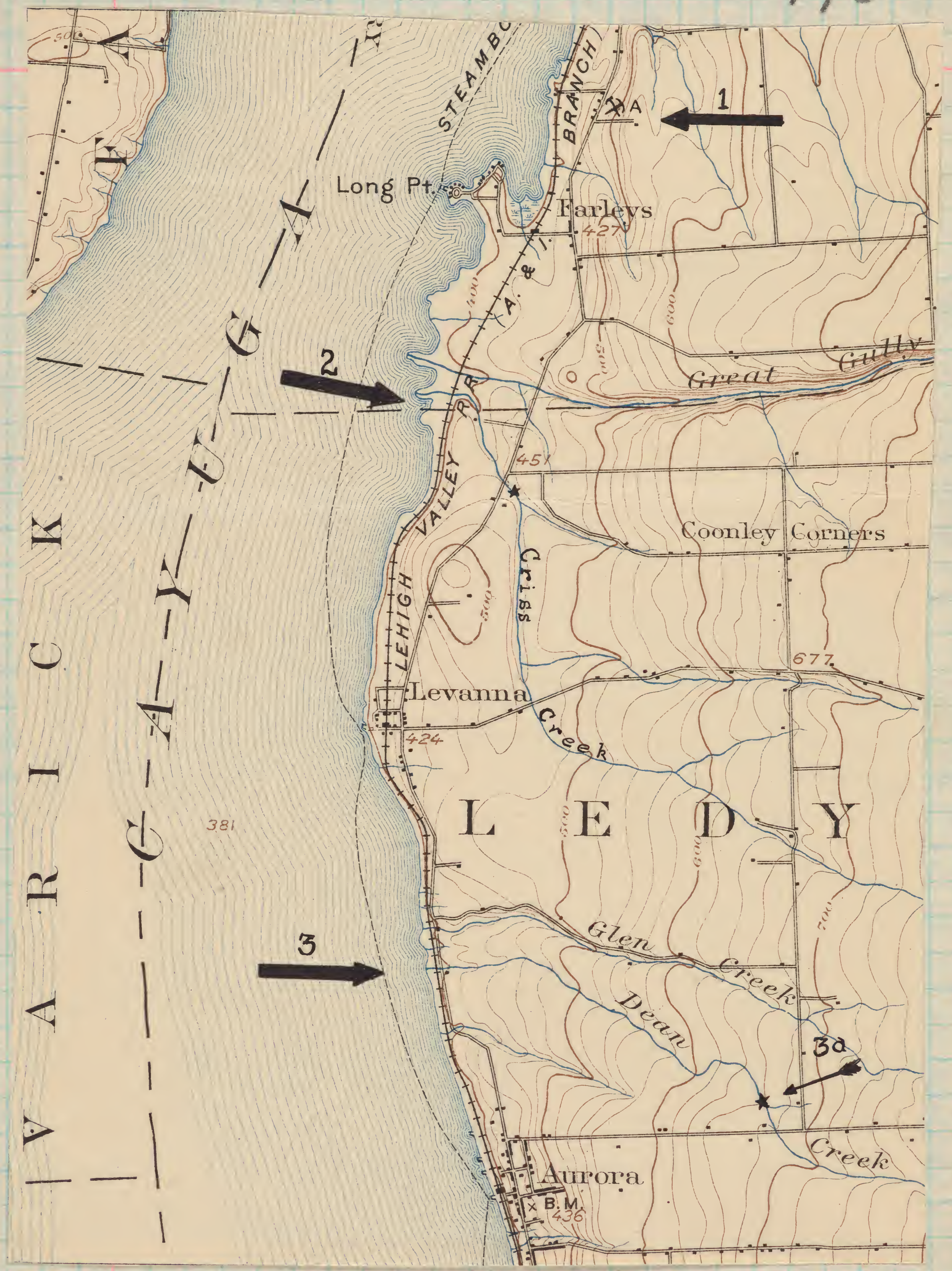
At 1235 shale is exposed in the stream
 bed just the Tichenor is 8' above it. The
 shale is very fossiliferous, abounding in corals
 & brachiopods.

The Tichenor was located in the stream
 about 38' below the first house along the
 roadway.

79a



796



ed to represent these

Variations appear on
res are represented on

d in blue, the smaller
and the larger streams,

ng or blue tint. Inter-

dry for a large part of
ts and dashes.

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wing the effect of light
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practice only the con-
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t. Contour lines show
valleys, as well as their
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are close together indi-
gether indicate a cliff.

express altitude, form,

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gradually away and forms an
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features is represented, directly
sketch, by contour lines.

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This interval differs according
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mountainous region it may be
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The heights of many points—
surfaces of lakes, and bench m
in figures, which show altitudes
exact altitudes—those of bench
coordinates of triangulation sta
issued by the Geological Surve

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ship, or reservation, are shown
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or prominent natural feature
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79a



79c



August 10.

Big Hollow Creek

About 31 paces from lake road are exposed about 10' of shales which are very dark grey in section, soft with a slight purple tinge on the surface. They are much fractured by irregular joints which in many cases have curved planes.

Fossils are few:-

✓ *P. fragilis*

N. triquetra

✓ *N. oblongatus*

A. small gastropod

393 paces soft very dark grey, much jointed shales are exposed for about 20' horizontally and 15' vertically. The shales are only slightly calcareous and have very irregular jointing planes. Fossils are more numerous here.

E. rugulata

N. triquetra

✓ *C. scitulus*

✓ *C. setigerus*

N. oblongatus

C. cf. Lepidus

L. curtum

P. fragilis

From 535 - 558 paces these shales are exposed and for fully 30' vertically. At stream level the following species were noted.

✓ *C. lepidus*

N. triquetra

✓ *C. setigerus*

✓ *L. pinnatus* (small)

A. umbonata

At 615 paces at stream level some large calcareous concretions may be noted. This is exposed for about 30' horizontally & contains

A. umbonata c

N. triquetra

P. fragilis

L. pinnatus

C. setigerus

M. subulata

N. oblongatus

L. laura c

At 800 paces comes the falls. At the bottom of the falls the *Schmeateles* shales are not very fossiliferous and are rather brittle and slightly calcareous.

The falls is 24 or 25' high.

At 25' the rocks break into chunkier fragments and have a decided grittiness to them.

At the very top of the falls the rock is a somewhat hard slightly calcareous shale with few fossils. The forms noted here were *C. coronatus*, *I. cinnatus*.

Above this come 9 or 10' of hard ^{sandy} shaley limestone that splits into flat slabs with some difficulty. This rock contains a fauna that is decidedly different from that below. These hard shaley ls. are about 16-20' thick if the contact of the *Schmeateles* is drawn at the brink of the falls in the small gully. The 9 or 10' of the walls of the gully belong to the shaley ls. These rocks do not appear like those at Centerfield and are not as fossiliferous. It may be that this "Centerfield" ls. expands in Madison Co., to form the division between the ls. at the St. road and the ls. at Fertileland Stock Farm.

Fauna

- ✓ *S. granulatus* c
- ✓ *V. pustulosa* c
- ✓ *I. cinnatus* c
- ✓ *A. princeps* sc
- ✓ *Par. hamiltoniae* sc
- Cameropectia* sp. sc
- ✓ *R. vanuxemi* r
- ✓ *S. perplana* r

- H. halli* r
- Lichenalia* sp
- ✓ *P. oviformis*
- ✓ *Pal. ^{constricta} concentrica*
- P. rana*
- C. boothi*
- ✓ *R. fimbriata*
- ✓ *S. solenoides*

- ✓ *D. sculptilis*
- ✓ *A. spiriferoides*
- Grammysia* sp.
- Lox. hamiltoniae*
- ✓ *B. lida*
- ✓ *S. inaequistrata*
- ✓ *C. vicinus*
- S. rectum*

- M. concentrica*
- ✓ *C. setigerus*
- ✓ *C. coronatus*
- ✓ *N. triquetra*
- ✓ *E. lindblaei*
- ✓ *C. micromatus*
- ✓ *Pal. fecunda*

At 958 paces above the falls the rocks are very much softer, still calcareous but less so than the rocks below. The very hard rocks went below the stream at 120 paces, also at 120 paces was found *S. rectum*.

At 1023 paces the shales are much softer filled with *Isomurus* but have practically the same fauna. Here were noted

- ✓ *I. carinatus* c
- S. angustus?*
- M. concentrica*
- ✓ *S. inaequistrata*

- ✓ *A. spiriferoides*
- ✓ *C. micromatus*
- ✓ *N. concinna*

V. pustulosus was found 5' above stream level at 920 paces.

From 1023 - 1128 these coarse shales prevail & contain specimens of *I. carinatus* large & transverse, also *D. sculptilis*.

At 1158 paces the same shales with *E. itys*, *N. concinna*, *S. andaculus*, *S. inaequistrata*. The shales here contain calcareous (impure) concretions.

At 1214 paces along the stream bottom these shales yielded -

- ✓ *Par. hamiltoniae*
- ✓ *B. papyrena*
- C. boothi*
- ✓ *N. concinna*
- ✓ *S. inaequistrata*

- ✓ *R. vanuxemi*
- ✓ *A. spiriferoides*
- ✓ *B. fimbriata*
- P. rara*
- Pal. ^{constructa} concentrica*

C. setigerus
Aulopora sp.
D. lineatum
S. rectum

M. concentrica
C. coronatus
Camantocchia sp.

About 2' above this fossiliferous zone come 40' of slaty, fine shales sparse in fossils & breaking into flat slabs. This sequence is like that in Madison Co. with the Fertile horizon going over into profusely fossiliferous shales and then into dark fine shales sparse in fossils. I imagine that about 3' above 1214 paces here is the end of Cleland's zone D.

At 1270 paces the coarse shales disappear and are here marked by courses of concretions of rather small size. At this point the dark shales come in. They have the appearance of the Shumateles below.

Fauna of the dark shales

P. rana
C. boothi
Artoceras sp.
N. triquetus

B. retrostrata
S. truncata
P. discoides
P. fragilis

At 1786 paces *L. laura* is common in the shales with *P. fragilis*

At 1924 paces about 50' of shales are exposed and the dark shales in the stream bed + for about 20' up.

1981 paces and $1\frac{1}{4}$ ' above stream the shale for a short distance is crowded with tiny specimens of *T. carinatus*. Here also were noted *S. truncata*, *L. laura*, *P. rana*

At 2085 is a cascade in the brook
 At 2100 the shales have become rather coarse and pass up into a blue gray

shale like the Earlville shale, when fresh, but weathering to a much lighter blue-grey. The shale below for almost its entire distance give a brownish grey powder when crushed.

At 2144 paces a large concretion in the bed of the stream had *P. stylipora* and *Loxoneurea* in it. About 4' above stream level at 2275 paces were found *N. triquetra*, *S. pennatus* and *C. bellistriata*, *Pal. hamiltoniae*.

At 2409 paces *S. pennatus*, *C. scitulus*, *C. setigerus*, *C. bellistriata*, *H. deKayi*, *C. boethi*, *I. submarginata*, *S. capillaria*, *B. leda*, *S. perplana*.

At 2478 the shales are softer & more argillaceous. At 2500 these yielded *Lox. hamiltoniae* with concretions forming about it as was noted on Kashong Ck. *C. setigerus* is very abundant and *C. scitulus* is common. *N. corbuliformis* was noted. These shales crumble into small chunky fragments. At 2635 paces these shales in the stream are like those below the *Pleurodictyum* beds and the slopes of the hills along the gully are covered with chips. The shales are now only sparsely fossiliferous. These represent the beds above the *Pleurodictyum* beds at Kashong Ck.

Lamna

A. umbonata

P. fragilis

below for 15

N. oblongatus

At 2932 — *S. fissimella*, *P. punctilifera*, *N. lirata*, *N. corbuliformis*, *N. oblongatus*, *A. umbonata*, *Pal. fecunda*, *N. triquetra*, *N. pygmaea*, *S. munitum*, *Orthoceras* sp., *Lox. hamiltoniae*, *Bactrites aciculus*?, *C. setigerus*,

At 3200 paces These fissile shales are still exposed for a considerable distance.

At 3274 paces in the dark shales were found:-

P. discoidium

N. triquetra

Ambocoelia sp.

C. setigera

Brachyodonta (scattered like those above New Lynn horizon)

M. subulata

I. submarginata

I. carinatus (small)

M. pygmaea

At 3351 paces comes the N-S highway but the Tichenor is not exposed on the lower side of it.

At the first intersection from the south of a road leading to the lake there are exposures of these shales.

At 497 paces west of the highway 3 large *Pleurodictyus* were found.

The shales from 450 on are more brittle and resistant under the hammer. Went west in this ravine 1350 paces and found no Tichenor. The ravine is so flat here that any further attempt was abandoned.

The shale at 1350 paces is a rather hard, calcareous (moderately) blue-grey shale quite massive & concretionary in structure. A concretion contained the following:-

✓ *I. carinatus*

✓ *O. carinata*

✓ *N. triquetra*

✓ *S. pennatus*

✓ *Chaetetes* sp.

✓ *P. fimbriata*

P. rowi

✓ *A. spiriferoides*

✓ *M. concentrica*

✓ *C. coronatus*

✓ *P. oviformis*

✓ *Pal. constricta*

P. rana

✓ *Goniophora hamiltonensis*

S. ellipticus

At 1300 paces fully 15' of rock is exposed but is not accessible for collecting. *N. oblongatus* + *S. cuneatus*?

At 1129 paces *I. sinuatus* is abundant. Other fossils are

✓ *C. vicinus* cc

✓ *C. bellistriata*

✓ *G. constricta*

Amantoeschia sp.

✓ *Grammysia* sp.

At 1065 paces - *M. mytiloides* + *B. lida*.
I. carinatus, *S. granulosa*.

1000 paces - ✓ *C. tenuistriata*, ✓ *S. perplana*,
✓ *I. carinatus*, ✓ *C. coronatus*, ✓ *C. bellistriata*,
✓ *M. pygmaea*, ✓ *S. pumilus*,

Remarks.

The Shalesteles in this ravine did not present any unusual features.

The Centerfield ls. here must be quite thick and must include the upper shale beds just below the shale that carries *L. laura*. It is not like the limestone exposed on Shaffer Creek, altho it resembles the upper beds there. On the more argillaceous rocks that rest on the "Centerfield" comes a thick series of 50' or more of dark and fissile shales with *L. laura*. No attempt was made to collect these beds as the fauna is meager and is given by Cleland. On this comes the Michelinia zone of Cleland which has coarser shales that break into rather thicker fragments. Fossils in this zone

were not very abundant but the few forms collected seemed to indicate that it was like the beds exposed in the lower part of Kaskong Creek and duplicated just below the first falls. On this bed is a recurrence of the *Lividulites* zone. This bed is very well exposed in and below the first falls and along the walls of the ravine at Kaskong. The zones on this I have not been able to follow. They require very detailed collecting. The section of rock containing *S. fissurella*, *Ostracoda*, *P. fragilis* and *Buchiola* at Kaskong and at Big Hollow Creek is quite thick. I should judge about 40'. It is the last rock exposed in the Big Hollow Creek at the highway crossing of the Creek & is exposed also west of the highway for a considerable distance. The last rock observed in the Big Hollow Ravine at 1350 paces and for about 500 paces below this is a hard somewhat calcareous and in some places concretionary shale with *Pelecypods* and an abundance of *P. calumatus*. The latter suggests that this is the "First *Atlagris* - *Cyprioidella* zone" of Cleland and here as far as my examination was concerned the sequence for this ravine ended. There must be still in the Ludlowville above this horizon 20-30' more of rock enough to accommodate two more zones below the *Tribolites*. Further east of the highway and crossing the stream bed not far from the road, but this cannot

be true from my examination, I suspect a small undulation in the rocks here for west of the highway about 500 paces the rocks appear shattered and in places the joints are very closely spaced, so much so as to make collecting a waste of time. The presence of a small undulation would throw the Tichenor far out of line.

It must be kept in mind that three *Platystrophia* of very large size like those of the upper Moscow have been found in the upper Ludlowville at both Kashong and Big Hollow.

88a



Aug 12

Sheldrake Crk. -

From 0-398 paces fissile dark shales representing those found ~~above~~ ^{below} the *Pleurodictyum* beds. These become progressively coarser and more fossiliferous as one progresses up-stream.

J. carinatus (very small)
H. albis
Ostracodes
N. corbuliformis

At 398 paces - some loose blocks ^{from 10' up} allow examination of the fauna:-

S. pennatus
J. carinatus (elongate)
C. scitulus cc
N. oblongatus
C. bellistriata

The stone at stream level and for 5' above is like that below but somewhat coarser in the way it breaks.

At 484 the shale is dark blue grey but is not calcareous:-

S. granulosa *M. concentrica*
S. pennatus c *C. scitulus* cc
Pal. plana These are from a boulder slumped down from about 10' up.
S. perplana
Pal. concentrica The real stone in the

lower 5' above stream is a soft dark grey shale, slightly gritty. It in texture seems transitional between that above + below.

From 520 - 640 - hiatus. The fine ^{dark} shale rock has given way to a dark blue-grey stone containing an abundance of *C. scitulus*, at 805 - ¹⁰¹ *A. boydi*, *S. perplanata*, *Grammysia arcuata*, *S. pennatus*, *A. decussata*, *C. scitulus*, *M. triquetra*, *Par. hamiltoniae*, *P. rana*, *S. acutostriatus*, *C. corrugata*, *C. bellistriata*, *Lichenalia* sp., *Pal. feminea*, *M. bellistriata*, *P. flabellum*, *Gon. hamiltonensis*, *M. concentrica*, *A. spiriferoides*, *S. perplanata*, *C. indenta*, *M. oviformis*, *H. dehayi*, *C. boothi*, *Grammysia* sp.

At 1014 paces

✓ <i>S. pennatus</i> cc	✓ <i>M. oblongatus</i> r
✓ <i>L. delphicola</i>	✓ <i>A. spiriferoides</i> r
✓ <i>C. scitulus</i> cc	✓ <i>M. triquetra</i>
✓ <i>C. bellistriata</i> c	✓ <i>M. pygmaea</i>
✓ <i>Pellerophon</i> sp	✓ <i>B. crenistria</i>
✓ <i>Modiomorpha</i> sp.	✓ <i>J. cainatus</i> r
✓ <i>Pal. concentrica</i>	✓ <i>P. radiata</i>
✓ <i>S. granulosa</i>	✓ <i>M. bellistriata</i>

Orthoceras sp.

The shale here is rather gritty and a dark blue grey like the shales of Earlville or Red Gate below the ls. at 1088

C. scitulus & *C. bellistriata* are very abundant. *S. nuntium*.

1088-1170 - hiatus

From 1170 - 1500 paces the same rocks have been traversed and for practically all of the distance either line the sides of the stream or form the bed of it. At 1500 the fauna is somewhat different:

✓ *C. boothi*
 ✓ *S. pennatus* cc
 ✓ *C. sicutulus* cc
 ✓ *C. bellistriatus* c
 ✓ *S. rectum* c
 ✓ *A. spiniferoides* c
 ✓ *S. perplana*
 ✓ *S. perversa*
 ✓ *P. rana*
 ✓ *N. liata*

✓ *M. concentrica*
 ✓ *S. granulatus*
 ✓ *N. bellistriata*

Along the stream between here and 1678
S. pennatus, *A. spiniferoides* & *C. bellistriatus*
 are the most abundant forms. Other
 fossils noted are

A. umbonata
Aviculopecten sp.
S. rectum.

M. pygmaea
Pal. concentrica
constricta

At a few places in the falls *A. spiniferoides*
 and *S. rectum* were noted. A large loosely
 coiled snail was also seen. The brink
 of the falls is 77'4" from the bottom at 1696
 paces. Horizontally about 25 paces would be
 taken up by the falls. The rock on the brink of
 the falls and for 6' above is a hard gritty
 shale, in places concretionary and
 calcareous. Fossils are not abundant but
 the following were seen:-

H. dekeyri

S. tullius ? cc.

A. princeps ?

A. spiniferoides

S. pennatus

I. carinatus

At the brink of the falls the Tichenor is 6'6"
 above the falls. 21 paces upstream it forms
 a cascade.

The Tichenor is a hard grey crystalline
 ls. here, 11 inches thick. Fossils noted in
 it are:- *C. coronatus*, *I. carinatus*, *S. pennatus*,
R. vanuxemi, a cup coral, *A. spiniferoides*,
Camarotoechia sp., *D. sculptilis*,

On the Tichenor comes several coarses of thin ls. separated by shale layers about 4' in thickness. The fauna of these is given as a whole

Camarotoechia
I. exigua
Favosites sp.
 Cup corals

I. bellulus

Cyrt. hainttonensis

✓ *S. granulosa* cc

Grammysia sp.

C. vicinus

A. princeps in sh.

C. coronatus

Platyceras sp.

H. deksayi

S. pennatus

R. vanuxemi

P. rana

C. mucronatus.

S. perplana

I. carinatus
S. pennatus
 Bryozoa
 sh. 2' 4"

8" sh + ls. } alternations
 1' 3" } 1' with corals. 4'
 Tichenor 11"

Inebratulids

At 100 paces the topmost ls goes under the stream. But here on this is still another 2' layer mostly of ls. but with considerable shale and abounding in *S. granulosa*. This makes for the Tichenor a total of about 6' 11"

This upper bed goes under at 162 paces

The shale above the upper 2' of ls. extends to 198 paces. It contains *R. vanuxemi*, *Grammysia* sp., *I. carinatus*, *P. rana*, *S. granulosa*, *C. congregata*

At 198 1/2' of shale, above stream level belongs to that just described and on this

a thin band of ls. with many fossils: - *I. carinatus*, *R. vanuxemi*, *C. L. penelope*, bryozoa, *P. rana*, *P. stylopoda*

sh
 4' - 5" shls.
 10"
 1 - 2"
 2' 10" sh
 1" ls
 6" sh

Fauna of shale above 4-5" ls. from
a slumped boulder:-

A. spiriferoides cc
P. rana
Ceratopora
C. vicinus
Pal. concentrica

Lox. delphicola
M. concentrica
C. setigens

In the 2' 10" of sh. - *I. carinatus* c, *Taomurus*,
S. pennatus. In the 1-2" calcareous sh.
Byozoa & *S. pennatus* are common

At 300 paces the 4-5" band forms a
cascade in the stream and a flat for
35 paces.

At 335 paces blue grey shales are exposed
and their fauna is noted here:-

A. spiriferoides

C. boothi

S. granulatus

N. corbuliformis

A. decussata

I. carinatus

C. mucronatus c.

N. triquetra

S. pennatus

Are exposed to 383 paces.

383-1360 hiatus

1360 - dark shales with

✓ *I. submarginata*

N. triquetra

✓ *M. pygmaea*

✓ *O. lodicensis media*

✓ *L. laura*

N. lirata

✓ *P. fecunda*

N. oblongatus

✓ *P. emarginata*

P. constricta

Modiomorpha sp.

C. boothi

✓ *C. setigens*

Orthoceras sp.

P. rana

1460 - 1565 hiatus

At 1565⁻¹⁵⁸⁵ are shales. That are non-calcareous but are not so brittle and do not break into the thin pieces like those below. There is also a change in the fauna here:-

L. laura c
S. andaculus
A. spiriferoides c
S. rectum
T. submarginata
P. stylopoda var.

Amplexus
A. reticularis
C. bellistriata
R. penelope
Lingula sp.
U. oblongatus

At 1800. passes comes the falls over the Tully just below the road.

The basal layer of the Tully here is 56" thick and make the total exposed rock as 12' 7". A dam has been built on the Tully just west of the highway bridge and this may obscure some of the layers.

~~16' falls over Tully. - about 10' of it missing?~~

16' falls probably memory P
 ≡

3110
 820
 3381
 239

Groves Ck.

See p. 88a for map

The "Enimal" beds are like those at Sheldrake and consist of alternations of ls and shales to the extent of about 10' 10". In them *S. carinatus* was abundant. At 66 paces the hardest of these goes under the stream but at 77 paces is a sequence similar to that at 198 paces on Sheldrake Ck. Here on a hard bed containing *S. granulosa* in abundance come 2' 3" of dark blue grey sh., then a thin band of calcareous sh. with many fossils, then 1 1/2 sh. which is blue black, then 1" calc sh., mounted by a foot of sh. with abundance of *S. penicillatus* and *S. carinatus*, then 3" hard shale mounted by shales with *C. mucronatus* corals and *A. spiniferoides*.

At 518 paces *A. umbonata*, *P. rara*, *A. spiniferoides*, exposed for 20 paces.

518-595 hiatus

595-643- *A. umbonata*, *P. rara*, *C.*

840-855 - a small exposure with

A. reticularis, *S. granulosa*.

921 a hard calc. band and on this shale is exposed to 982 paces. The shale at 975 is becoming darker and that in the banks above is fissile. The shales from 921 to 975 carry *A. reticularis*, *S. rectum* & *S. granulosa*.

At 1025 they are the dark brittle sh. At 1109 comes the falls = 1109 is 10' 10" above 1026 pace. The dark fissile shales are 15-20' thick for about 5 1/2' above 1109 they have disappeared. Fauna of the light blue grey shales below the falls.

✓ *R. vancouveri*
 ✓ *S. andaculus*
 ✓ *S. rectum*
N. corbuliformis
 ✓ *A. spiriferoides* c
 ✓ *A. reticularis*
Jaomurus
 ✓ *Cyrt. hamiltonensis*
 ✓ *Chaetetes*

✓ *P. stylopora*
P. costata
 ✓ *R. fimbriata*
C. bellistriata
 ✓ *S. mearnsi*
 ✓ *S. angulatus* bottom
I. carinatus at 32' from
S. inaequistriata

The falls is 43' 4" to the bottom of the Tully from 1109. About 2' below the Tully the following fossils were found: -

S. inaequistriata
I. carinatus c
S. andaculus
A. reticularis
D. lineatum
M. concentrica

R. vancouveri
C. setigerus
S. rectum
C. incusmata

The uppermost 2' of shales below the Tully are black and very fissile.
C. scitulus, *S. munitum*

Remarks on sections visited
 Aug 11-12.

The Ludlowville seen at Bloomer's Crk & Sheldrake reflects the sandstones of the east. The beds are usually a shale rather like the Earlville shales but not quite as dark. I cannot place these beds of the upper Ludlowville in the Madison Co. section, unless it be in the shales that lie on the N. quarry.

The "Cincinnati" beds in the three ravine visited are all quite similar showing a hard band at the

bottom that is nearly one foot thick and above this shale and Crinoidal ls. alternations for 10' or more. *C. impressa* was only found at Bloomer Creek. Above the Encrinural beds the shales contain an abundance of *S. pennatus* + *S. carinatus*. On these bed come shales carrying *A. spiriferoides* and these go over into beds that carry *A. reticularis*, *S. granulosus*, *R. perelopez* + at Bloomer Crk. *A. spinosa*, also *S. rectum*. Then follow more Ambocoelias, then fine fissile shales with *O. locheus* media and *L. laura*. These give way to lighter shales with *A. reticularis* and large *Spirifers*, also *S. rectum*. Finally the shales carry lentils with many bryozoa. In all of the ravines so far examined there has been a dark fissile shale zone of varying thickness below the Jolly. At Groves Crk. it was only 2' thick but at Rushong Cleland says 7'. The transition from the blue shales to the black is quite abrupt.

At Groves the Jolly that was exposed in the quarry measured 13' 4". The lower layer was 40" thick.

August 10

Bloomer Creek.

Along the shore and slightly south of Bloomer Creek are cliffs of dark shales which crumble rather readily. They are non-calcareous. The higher beds about 15-20' above lake level crumble into rather stout irregular pieces. Fossils observed in these rocks are:-

✓ <i>B. reticulata</i>	<i>S. pinnella</i>	✓ <i>M. pinnata</i>
<i>P. discordans</i>	✓ <i>C. setigera</i>	✓ <i>B. lida</i>
✓ <i>N. oblongatus</i>	✓ <i>S. truncata</i>	✓ <i>I. carinatus</i>
<i>P. rana</i>	<i>P. pinnatifida</i>	<i>O. lodensis media</i>
✓ <i>N. triquetra</i>	<i>Lox. hamiltoniae</i>	<i>Ostracoda</i>

The *I. carinatus* are all very small (small) and the *Lox. hamiltoniae* has a concentration forming about just as was noted below the first falls at Kashong Cr. These beds along the shore at this point belong to the shales that lie on the Michelinia zone at Kashong Creek.

Below

150 paces upstream there is a small exposure of these shales, much jointed. Here *O. exilis*? and *S. truncata* were abundant. Also *S. pinnatus* & a small *trigonia* were observed. These shales remind one strongly of those on top of the hill along the Eaton road in Madison Co. Wood fragments also seen.

At 350 paces and a wash of blocks from about 15' above the stream affords an opportunity to examine the contents. These shales break into larger fragments than those below. They are not greatly fossiliferous but contained:- *O. lida*, abundance of *C. setigera*; *B. lida*, *Lox.*

hamiltoniae, *N. triquetra* and *S. pennatus*. The latter is the same ornate kind with long wing points, as seen in the upper Eaton shales.

490-500 faces an exposure of the shales which now break into large slabs and are not unlike the Edville shales. These shales break into blocks often with a curved surface so that one face may be squarish but the others tapered to an acute \angle . These yielded for about 10' up an abundance of *C. scitulus*. Other fossils noted were *O. parvula*, *N. bellistriata*, *Lox. hamiltoniae* (with concretions), *S. pennatus*, *C. boothi*.

500-687 - hiatus

At 687 faces the shales are hard under the hammer & gritty to the teeth. They give only a slight effervescence with acid. Fossils:-

✓ <i>A. umbonata</i>	<i>S. perplana</i>
✓ <i>S. pennatus</i> (very transverse)	<i>N. oblongatus</i>
✓ <i>J. submarginata</i>	<i>Pal. constriata</i>
✓ <i>C. bellistriata</i>	<i>N. biata</i>

740-781 - dark blue-grey massive shales. These shales leave the stream bed very irregular when the smaller blocks are plucked out leaving deep circular pits and pockets. Fossils are not abundant but the following were noted:-

✓ <i>N. triquetra</i>	<i>M. pygmaea</i>
✓ <i>S. pennatus</i>	✓ <i>C. bellistriata</i> c
✓ <i>N. lirata</i>	✓ <i>A. spiriferoides</i> r
<i>B. leda</i>	

840 - about 30' vertical + 50' horizontal of rocks exposed. The stone that has fallen into the stream is a darker shale than that at 781.

890-900 paces - sparsely fossiliferous dark shales. Fauna in stream bed & up to 5' above stream level -

- ✓ *N. corbuleformis* *M. pygmaea*
- ✓ *A. umbonata* (small)
- ✓ *S. pennatus*
- ✓ *N. triquetus*

The shales in the stream bottom have the concentric structure & appearance of the soft shales on the Michelinia beds. Above they appear coarser.

982 paces - 2 ravines intersect - large exposure. The lowest shales here are like those below and yielded an abundance of *M. pygmaea* but little else. By abundance here is meant that more of *M. pygmaea* than any other fossils were found. *N. oblongatus*, *N. corbuleformis*, *N. triquetus*.

At 1072 & 1150 the same soft shales - at the latter place were found *Pal. concentrica*, *N. triquetus*, *N. corbuleformis*.

At 1183 the shales in the stream bed are exposed for about 30' and yielded:-

- ✓ *M. lirata* ✓ *S. pennatus*
- ✓ *C. scitulus* *Orthis* sp.
- ✓ *O. carinata* ✓ *N. oblongatus*
- ✓ *O. parvula* ✓ *N. triquetus*
- ✓ *Modiomorpha* sp.

1230 comes a fall; the brule would be at about 1250 paces. The shales here are massive and in places quite calcareous. The fall was measured to be 54' 7" high. This massive shale must include the second

Cypriacalbe - Atypis zone of
 Cleland. Collecting here in the upper
 30' was not possible due to the
 steepness of the cliffs

Fossils below falls.

- | | |
|------------------------------------|---------------------------|
| ✓ <i>I. carinatus</i> c | <i>L. ligen</i> |
| X <i>Grommopsis constricta</i> | <i>C. vicinus</i> |
| ✓ <i>Pal. constricta</i> | <i>Lepidodendron</i> sp. |
| ✓ <i>M. concentrica</i> | ✓ <i>C. coronatus</i> |
| ✓ <i>M. triquetra</i> | <i>Grommopsis</i> sp. |
| <i>L. orbiculatus?</i> | ✓ <i>Cryptonella</i> |
| ✓ <i>C. bellistriata</i> c | ✓ <i>S. arctostriatus</i> |
| ✓ <i>S. pennatus</i> | <i>Lox. delphiola</i> |
| <i>Aviculopecten</i> sp. | ✓ <i>Par. hamiltoniae</i> |
| ✓ <i>Sonophora</i> sp. | ✓ <i>E. lincklaeni</i> |
| <i>Modiomorpha</i> sp. | <i>Ligula</i> sp. |
| <i>Pal. concentrica</i> | |

On the brink of the falls is a layer of ls.
 seven inches thick. It is fine grained and
 light grey, and contains an abundance of
 fossils: -

- | | |
|------------------------|----------------------|
| <i>H. deparzi</i> cc | <i>A. princeps</i> |
| <i>I. carinatus</i> cc | <i>S. perfoliata</i> |
| <i>C. boothi</i> | Ostracods |
| <i>C. setigerus</i> | |
| <i>C. bellistriata</i> | |
| <i>C. coronatus</i> | |

On this comes a soft shale for a
 few inches, then about 1/2' shaly
 ls with a prolific fauna

*P. stylopoda**S. granulosa* c*R. vanuxemi* c*S. pennatus* r*C. coronatus* r*C. impressa* cc*P. rana* c*Camerothechia* sp r*J. carinatus* r*Platyceras* sp r*S. perplanus* r*M. concentrica* r

40-65 paces above fls. is a blue shale 1'-1 1/2' thick on the ls described above. This ls. is coarse granular in places from crinoid remains but breaks into irregular layers 2-3" thick separated by thin layers of shale. This goes under the stream 28 paces from the bank.

The shale on it is soft light blue-grey and contains:-

*O. annulus**S. pennatus**J. carinatus**S. granulosa**S. perplanus**Cyrtodictya*

A thin ls. band comes on top of this shale at 50 paces. and crosses the stream at 66. At 96 paces 6" of shale in the stream bed are separated from 6" more by a thin (2") seam of shaly crinoidal stone. The upper 6" of shale is separated from 2' of shale by a 1/4" band of hard sandy shale. This latter is slightly calcareous and contains *C. scitulus* & *S. pennatus*, *Lox. delphicola*. Up to 175 paces coarse shales continue & contain also *J. carinatus*.

From 200-257 paces the stream is lined by about 1/2' of shales containing:-

A. umbonata cc*C. bellistatus**A. spiniferoides**P. al. concentrica**C. scitulus**C. coronatus**S. granulosa**C. vicinus**C. coronatus**R. vanuxemi*

Par. hamiltoniae

Corals.

At 243 paces *A. umbonata* is very abundant in patches. Also *Prana*. Other fossils are *P. munda*, *P. tenuis*, *P. discordium*. These shales are soft & dark grey. The *C. vicinus* *A. spiniferoides* layer is succeeded by this *Ambocoelia* band. *C. setigerus*. *N. lirata*

This band is terminated at 287 paces by a ls band composed almost wholly of shells. It has:-

A. spiniferoides cc. *R. vanuxemi*
S. bellus
A. umbonata

In the shales above this ls at 290 come:-

P. rana *Modiomorpha* sp.
N. triquetra ✓ *C. vicinus*
S. acrostriatus *A. umbonata*
C. bellistriata
Pal. constriata

300-347 - *linatus*

347-407 - *Ambocoelia* still very common.

Also present are - *Pal. constriata*, *N. triquetra*, *C. mucronatus*, *O. lodinensis* media, *Pholidops hamiltoniae*, *M. pygmaea*

C. cornutus } at 450.
C. setigerus

At 495 a large block of dark grey shale has fallen from about 8' above stream level. This contains:-

C. boother ✓ *A. reticularis*
R. penelope ✓ *C. spinosa*
✓ *A. spiniferoides* ✓ *R. fimbriata*
Cystodictya sp. *S. junia*

✓ *N. biata*
 ✓ *Pal. constricta*
P. rana
 ✓ *M. concinna*
 ✓ *C. bellistriata*
 ✓ *M. pygmaea*
S. cratulum
S. granulatus
Goniatite
 ✓ *I. submarginata*
 ✓ *C. coronatus*

✓ *S. inaequistriata*
 ✓ *S. andersoni*
 ✓ *M. concentrica*
 ✓ *S. penultima*
 ✓ *N. oblongatus*
 ✓ *S. chemungensis*
 ✓ *L. rotellata*
Aviculapecten
Pteriopecten
 Coral.

at 648 paces

✓ *Cystodictya*
 ✓ *Chidophyllum*
 ✓ *Amplexus*
 ✓ *A. spinosa*
 ✓ *A. reticularis*
 ✓ *Pal. constricta*
Spinifer. sp.

The shale here weathers to a light gray.
P. rana
 ✓ *S. granulatus*

✓ *S. inaequistriata*
 ✓ *A. spiniferoides*
 ✓ *C. bellistriata*
 ✓ *M. concinna*
 ✓ *M. concentrica*
 ✓ *R. fimbriata*
R. penelope
S. rectum
R. fecunda

at 780 the road.

89 paces west of road the shales have:-

A. umbonata
C. scitulus

C. boothi

Pal. constricta
C. setigenus

194 & 209 paces *A. umbonata* common
 also *P. rana*. Shales soft.

319-396

C. coronatus
C. reticularis
H. corcinna
S. rectum
C. spiniferoides

S. granuloseus
R. vanuxemi
S. jinia
S. concava?

495 in stream bed
S. granuloseus

535-573 paces shales dark + fissile
 at 573 a loose block has *L. laura*.
O. lodensis media at 573 in place.

At 688 paces these carry *L. laura* and
 extend vertically about 15'.

At 1130 blue grey shales are exposed
 for about 30'.

At 1210 the shales are coarser and
 break into heavier pieces. *S. channingensis*,
C. pleurotomaria.

At 1370 there are 16' up to the base of
 the Tully these are blue grey shales with
 thin seams of ls. The fossils are:-

<i>C. coronatus</i>	<i>C. reticularis</i>	<i>R. vanuxemi</i>
<i>S. concava</i>	<i>Cystodictya</i>	<i>C. decussata</i>
<i>S. pennatus</i>	<i>S. rectum</i>	<i>H. deKayi</i>
<i>D. lineatum</i>	<i>S. Menziesi</i>	<i>Cran. ham.</i>
<i>Pod. constricta</i>	<i>E. bellistriata</i>	<i>M. concentrica</i>

This fauna occurs to about 5' 6" below
 the Tully when the shales are dark
 and fissile and have *M. subumbona*
 + *S. minutum*

I make the Tully 11' thick. The lowest
 bed is about 4' thick. The mass is
 crumbly and not unlike that at
 Kashong. *H. cuboides* was found in
 the dirt below the bottom where the

shale had been excavated out. The lower portion in contact with the Moscow is quite shaly suggesting a transition. *M. subumbonata* was also found here.

The shales immediately below the Moscow are not well exposed and are mostly covered, however their dark chips are strewn over the slopes. $6\frac{1}{2}'$ ofully are exposed in the face of the falls and about $4\frac{1}{2}'$ in cascades above.

1117 paces the shales have

C. congregata

Spinifer sp.

S. nuntium

Par. hamiltoniae

C. undata

Lox. hum.

and have changed to a less fissile stone showing transition to the rocks above.

1370

491

879 - *P. emarginata* in the soft fissile sh.

730 the fissile shales are closely jointed by sets running NW + another almost at rt. ls.

At 475 paces the coarser shales with *L. granulosa* + *a. spiniferoides*.

In the sh. about 10' above the bridge along the road *L. consobinus* was noted.

1927

Bowdoin landing 8 mi S. of Skan. - for
Homalotus

Dean Crk and the Shore sections.

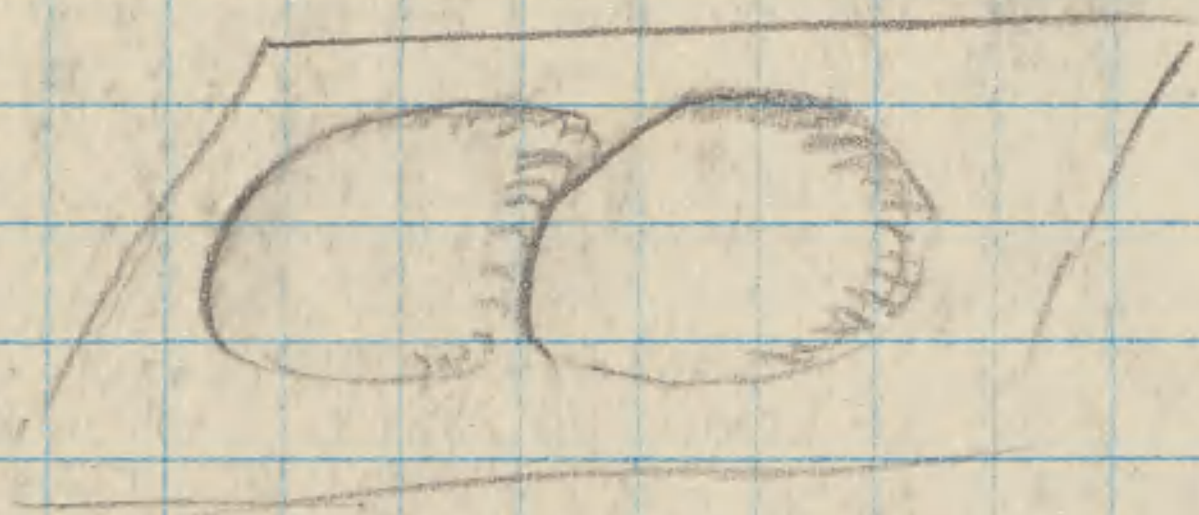
August 14.

296 paces south along the railroad a small cut permits access to the shore. Here are exposed 16' of shales that are dark grey in section and quite calcareous. On the weathered surface they are a lighter grey. They are very irregularly jointed as all such of these shales in the Hamilton are. In places masses with a curved surface can be broken out. The shales crumble readily into small flat fragments. Some of the joint surfaces are covered with rust from decomposed pyrite. These shales are distinctly grey and in so sense can be taken as black. Fossils are exceedingly rare. *P. discordans*

On Luther's map these shales on the shore are very close to the Cardiff-Skan contact and are indicated as Cardiff. Some of the beds on the beach proper are rather hard.

At 484 paces comes the beginning of the cliffs on the east side of the railroad track. At this place also a stairway permits examination of the shales for some distance. The shales here are for 20' vertical dark grey weathering to lighter they give a vigorous effervescence with acid. Fossils are again very rare only a *Parenka* and *A. umbonata* were noted.

In places where these shales break one of the bedding surfaces will include low rounded protuberances like a flattened botryoidal surface. This is



surface of a piece of sh.

what I believe is meant by concretionary structures in the sh.

At 630 paces the shales are very dark grey almost black & contain few fossils. *S. firmula*, *Bactrites*, *Orthis* sp. These gave practically no effervescence with acid.

At 703 paces 5' above the tracks - *S. firmula* + *Ostracodes*.

830-10' above the tracks - *P. fragilis* and a *Perorhynchus*, probably *Laura*, also *P. discoidum*. The shale here is very fissile where it is greatly weathered and falls to a powder or to thin flakes. At the bend where the railroad and highway diverge slightly about 50' vertical of rocks are exposed. From 1100 or 1200 paces on the rocks above are lighter colored and give a vigorous effervescence with acid. The shales in this whole sequence are very unfossiliferous along the railroad. The lighter upper shales are calcareous. The rocks are not exposed beyond 1500 paces from the Levanina station. It is 1725 paces to Glen Creek.

Deans Creek

500 paces from highway the first exposure consists of ashen grey calcareous, soft shales that are dark grey on the fresh fracture. These contain only a sparse fauna. *L. Laura* scattered & distant, *P. discoidum*, *Orthis*.

At this place a concretion was found that contains sphalerite as well as Galena. These are exposed to 573 paces & for 15' vertical.

573-715 hiatus

at 715 ⁻⁷⁶⁴ paces come shales like those

below.

764-830 listus

830-840 paces. some

Between here and 1100 come a few outcrops which have the same kind of shales. 1100-

1130 - *C. scitulus*, *P. fragilis*, *P. discoidium*, *L. laura* - none are abundant.

B. retrostrata & bryozoa were noted in a loose piece.

1155-1186 - similar shales.

1215-1240 - shales are medium blue-grey and . They contain *L. laura*, *N. triquetra*, and *B. leda* (with clayey concretion)

1338 - *P. constata*, *S. subulatum*

At 1465 about 15' of shales are exposed which have broken into large blocks that split rather easily into slabs or similar masses. Here, at this fossils, are not common, they are more abundant than they have been elsewhere.

S. croctulum?

P. fragilis

P. discoidium

B. leda

Bactrites sp.

N. corbuliformis

N. oblongatus

N. triquetra

L. laura

Ostracods

S. fissurella

C. scitulus

P. punctilifera

L. curtum

1548-1580 in stream bed - dark, concretionary shales with *S. fissurella* & an *S. minutum*. Some loose slabs here, probably from above where about 15 or 20' are exposed are very fossiliferous and contain:-

A. umbonata

L. laura

Bryozoa

S. croctulum

Gonophoroceras?

At 1658 is a massive shale in the stream bed that is prolific in *S. crotatum*, *R. disjunctum* and snails. Also it contains *M. pygmaea*, *N. triguter*, *A. decussata*, *N. orbiculiformis*, *M. subalata*, *S. arctostriatus*, *L. capillaria*, *A. spiriferoides*.

1781-1836 - dark shales, brittle, concretionary with *L. laura*. Rocks exposed here 30' up.

1870-1900 - dark shales abounding in *L. laura*. Also noted were *N. triguter*, *A. decussata*? *L. laevis*?

2073 and 2075 - large exposures of sh. Outcrops are practically continuous from 2075 to 2070. From 2040-2070 is a large exposure, the shales in the stream bed + a foot above are crowded with *L. laura*, in some cases so much so that the shale appears to be made up of this shell. Other fossils are: *A. decussata*, *A. truncata*.

A loose slab had *Holopea*-like snails, *A. umbonata*, small bryozoa *A. decussata*, *L. laevis*, *M. pygmaea*, *L. curtum*, *C. setigenus*.

The shales along the stream here are very dark, split easily into thin pieces and are slightly calcareous.

2430 - *L. laura*, *Leptostena*, *Ambocoelia umbonata*, *N. triguter* in a dark sh. Also *E. regulata*?

At 2567 a hard band forms a small cascade in the stream. This is composed of a calcareous shale that crumbles into small fragments under the hammer. This is about 6" thick and has many fossils. *N. triguter* is very abundant as are snails.

Other forms are *M. pygmaea*
Orthoceras sp., *C. scitulus*.

Above this are the same
 shales as below. When dry they are
 light gray but when damp are very
 dark. At 2827 paces they are blue
 gray and only faintly calcareous.

L. laevis

O. minuta?

L. laura

Crinoid stems

P. fragilis

E. rugulata

At 3025 paces a broad level can be
 used. Here the stream forms a
 cascade over the shales and a gorge.
 On the N.E. the shales tower above
 to fully 80'. Probably among them
 is the Centerfield ls.

10' up fossils are - *N. subulatum*,
M. pygmaea, *N. triquetrum*, *P. fragilis*,
~~brachiopods~~, *S. pinnatus*.

In about 125 paces 38' vertically
 were traversed and this carries me
 to 3150 paces upstream. Concretions
 were noted in the shales about 50'
 up at the cascade.

3253 a small exposure carries large
 oval calcareous concretions and many
 fossils - *L. laura*, *M. subulata*, *C. scitulus*,
M. pygmaea, *N. subulatum*, *Spirifer* sp.,
N. triquetrum, *Leptopteria* sp., *Orthoceras* sp.,

At 3287 a smaller exposure yields
G. umbonata c., *P. discoides*, *M. oblongatus*,
N. corbuliformis, Crinoid stem fragments.

at 3622 paces comes the falls with
the centerfield on top. at 43'4" feet above
the 3622 paces comes top of falls

See shales in the first 5'5" camp
L. lamina c. P. fragilis, some of the L. lamina
are pyritized.

5'5" - 10'10" - same

10'10" - 15'15" - R. fimbriata,

15'15" - 20'20" - A. umbonata, C. mucronatus
Cyrtina lamina, P. fragilis, C. boothii, Pal.
Concentrica

20'20" - 25'25" C. belliculata

The brink of the falls is at just 8
steps up which is 43'4". The fauna of
these calcareous shales & ls. on the top
of the falls is as follows: -

- | | |
|----------------------|---------------------------|
| ✓ C. indenta | ✓ C. setigerus |
| P. rana | ✓ M. corianna |
| A. terebratulid | ✓ C. vicinus |
| ✓ T. carinatus | ✓ Bryozoa |
| ✓ A. serpens | ✓ A. decussata |
| ✓ Chaetetes | ✓ S. inaequistriata |
| ✓ Spiner divaricatus | ✓ C. imbricata |
| ✓ S. andaculus | C. boothii |
| ✓ Leiopteria | C. boothii var collitales |
| A. crinoid. | ✓ M. haskinsi |
| ✓ A. spiniferoides | ✓ V. pustulosa |
| ✓ M. triquetra | ✓ Par. hamiltoniae |
| ✓ C. scutulus | M. subumbona |
| Geniophora lam. | ✓ R. fimbriata |
| S. arctostriata | ✓ C. coronatus |
| ✓ R. cyclus | ✓ D. sculptilis |
| ✓ R. penelope | ✓ M. concentrica |
| | ✓ E. birchlaeni |
| | ✓ S. perplana |

At the top of the falls there are about 4' more of these calcareous shales making, from where the *R. pinnata* was found 25 or 30'. These break readily and fall to small fragments on exposure.

135 paces upstream ^{from the falls} and just under the bridge of the former road come the dark fissile shales of the Lower Ludlowville (3rd *Lichynchus* zone). These are exposed for some distance up the stream. The stream intersects the road at about 300 paces from the brink of the falls. In the upper part of Glen brook upstream from the upper highway crossing, dark fissile shales were exposed and these were also taken to be those of the upper Ludlowville. No attempt was made to collect any of the Ludlowville beds except the Centerfield.

45
12
36

Aug. 10.

Paines Creek.

Moonshine Falls.

1st 5'5" - shale soft silty,

L. lunata *O. media* *P. fragilis*
5'5" - 10'10"

10'10" - 15'15" - Shale is coarser and contains *O. umbonata*, *P. lunata*, *C. boothi*, crinoid stems, *Lox. ham.*, *L. perplana*, *Pal. constricta*

15'15" - 20'20" - Shale still coarser, weathers blue grey:

O. constricta

O. carinatus

Par. ham.

M. perplana

S. sculptilis

C. micronatus

R. fimbriata

Aviculosesten sp.

P. rove

L. perplana

I. submarginata

The boundary is apparently established between 15'15" + 20'20". We shall take the 15'15" mark as it showed the first evidences of change.

20'20" - 25'25" - coarse blue shale, weathers blue grey, fossils abundant.

O. spiriferoides

C. micronatus

25'25" - 30'30" - Hard shale

M. concentrica

I. carinatus

O. spiriferoides

O. princeps

C. binus

C. decussata

$$\begin{array}{r}
 1220 \\
 2 \\
 \hline
 2440 \\
 302 \\
 \hline
 2742
 \end{array}$$

$$\begin{array}{r}
 5200 \\
 2745 \\
 \hline
 24550
 \end{array}$$

$$\begin{array}{r}
 (1700) \quad 2745 \\
 25000 \\
 \hline
 1450
 \end{array}$$

(5.1)

$$\begin{array}{r}
 2 \\
 10 \\
 \hline
 12
 \end{array}$$

$$\begin{array}{r}
 39 \\
 10 \\
 \hline
 24 \\
 5
 \end{array}$$

$$\begin{array}{r}
 900 \\
 100 \\
 \hline
 1000
 \end{array}$$

$$\begin{array}{r}
 27 \\
 5 \\
 \hline
 135
 \end{array}$$

6

1

30'36" - 35'35" 11 - Top of falls, same rock
as in lower interval. Fossils here at top of falls:

Javosites	I. cuneatus	C. coronatus
I. divincatus	P. rowa	V. pustulosa
R. fimbriata	A. macronota	
D. macquatrata	C. vicinus	
P. rowi	D. macquatrata	

There are 253 paces from the brink of the falls to the Highway bridge, the bed of the Centerfield contact comes ~~122~~ 122 paces upstream from the falls. From the brink of the falls to the contact (100 paces) is one hand level step, and 16' of bedrock are exposed to the bridge. The Centerfield is estimated here to be 30 feet thick.

125 paces upstream from the bridge a ~~40~~ falls exposes the Centerfield again for paces upstream. The top of the Centerfield comes about 27' above the top of Moonshine falls. This gives a dip of 27' in about 450 paces or 135' per mile to the west and north. At 468 the top of the Centerfield is 17' above stream level. At 600 paces it forms a 3' cascade in the stream and then disappears ^{in 10 paces}. The top of this cascade is about 30' in the stream above the bridge. The Centerfield is apparently a long arch here, one limb of which is dissected by the stream. The dip is prevailing to the north and west. At the cascade the rocks have N 69 E 5° NW. The bedrock is exposed at 600 in a cliff fully 40 feet high. A bedding plane of the bedrock dips 10° upstream (same component).

3923

3840
65
3575

Fossils seen in the Ledyard are:

<i>L. laura</i>	<i>Panetka sp</i>
<i>O. media</i>	<i>M. trugister</i>
<i>P. fragilis</i>	<i>P. rana</i>
<i>S. gibberella</i>	<i>S. submarginata</i>
<i>S. truncata</i>	<i>M. oblongatus</i>
<i>S. pennatus</i>	<i>L. saevus</i>
<i>M. pygmaea</i>	<i>Pal. constricta</i>
<i>N. collariformis</i>	<i>B. retrostriata</i>
<i>J. cinnatus</i>	<i>M. subalata</i>
<i>Spyroceras</i>	

25' per mile

At 900 paces the Centerhill is again exposed from 600-800 the cliff of shale is further 40-60 feet high perhaps higher. At 1013 Centerhill is 3' above stream level. At 1157 the Ledyard is in the stream with a dip to the south 1199 - Ledyard exposure ends.

1200 - 1455 - covered

At 1455 is 40' of Ledyard

The Ledyard ends at about 3337 paces. The shale above it weathers to a light grey and has

<i>J. exigua</i>	<i>S. pennatus</i>	<i>P. rana</i>
<i>A. granulosa</i>	<i>D. acuta</i>	<i>J. cinnatus</i>
<i>R. fimbriata</i>	<i>C. bellistriata</i>	<i>M. concentrica</i>
<i>C. scutulus</i>	<i>P. oviformis</i>	<i>L. perplana</i>
<i>A. decussata</i>	<i>A. spiniferoides</i>	

This zone must disappear about 3575 No *Plumodictyus* were seen.

On the succeeding shale well-preserved *S. pennatus* are common. The shale is somewhat more crumbly than in the zone below

3732 - 3900 - covered

3900 -

$$\begin{array}{r} 55 \quad 55 \\ 4 \quad 6 \\ \hline 59 \quad 61 \end{array}$$

at 4037 from a rock shale 10' above stream were seen.

J. carinatus
P. grandis
C. bellistriata c
M. mytiloides
M. concentrica

The shale is coarse and sandy

4370 - coarse shale in cliff 60 or 70' high.

4420 - 4520 - covered

4520 - coarse sandy shale

3' above stream a calcareous layer
 abundant in fossils:

A. spiroferoides
S. rectum
P. vanuxemi
P. iowensis
S. pennatus
P. labellum

L. perplanus
M. concentrica
P. rana
A. serpens
N. librata
How. hamiltonensis

Above comes dark sandy shale

At 4700 is a steep bank of dark shale
 fossils at stream-level are:

C. bellistriata
J. carinatus
A. granulosa

A. spiroferoides
S. rectum

Concretions are abundant here

It is 5400 paces to falls over Lichenor
 which ~~is~~ be 64 feet high to the
 Lichenor. The falls itself is not more
 than 50' high.

Beneath the Tichenor at Black Rock are 6' of ~~hard~~ arenaceous shale, strongly resembling the Deep Run shale except that it is somewhat coarser. Fossils are very rare: *S. tellus*?, *T. cuneatus*.

Tichenor - 2 layers lowest 9", upper 8 or 9". It contains

S. sculptilis

T. cuneatus

Bryozoa

A. spiriferoides

C. coronatus

C. boettii

D. exigua

C. incisurata

A. macronota

The upper layer abounds in broken bryozoa.

The upper layer also contains considerable shale. The limestone is followed by shale for 1 1/2', blue gray sandy, weathering of ashen color.

C. massimata

Camarotoechia sp.

Platyceras

Taraxites

This is followed by 1 1/2" of shaly ls, this by 6" shale and this by 2" limestone, 2" shale and 2" more of ls.

The shale and ls. above the Tichenor contains:

R. vanuxemi

T. cuneatus

L. pennatus

Platyceras.

A. macronota

The shale and limestone alternations extend for about 12' up. The upper part may include one or two of Cleland's lower thin zones.

The crinoidal stone of the Tichenor is about at 703' A.T.

August 12.

Tributary to Paynes Creek

Rock exposed at the junction of Paynes and the tributary is the Ledger shale.

0-5'5" - 31 paces of Ledger
 5'5"-10" - 42 " - covered
 10'10"-15'15" - 76 " - covered
 15'15"-20'20" - 45 " - covered
 20'20"-25'25" - 50 " - Ledger
 25'25"-30'30" - 54 " - "
 30'30"-35'35" - 75 " - "
 35'35"-40'40" - 69 " - "
 40'40"-45'45" - 69 " - "
 45'45"-50'50" - 55 " - "

The shale here is somewhat coarser than that below suggesting that it is near the termination of the Ledger. The rock shows evidence of deformation.

50'50"-55'55" - 66 paces - Ledger
 55'55"-60'60" - 79 " - "
 60'60"-65'65" - 58 " - "
 65'65"-70'70" - 100 " - "
 70'70"-75'75" - 60 " - "
 75'75"-80'80" - 67 " - "
 80'80"-85'85" - 73 " - "
 85'85"-90'90" - 60 " - "
 90'90"-95'95" - 60 " - "

At about one foot above 90'90" or 97' above the stream intersection the rock is coarser and contains a different fauna:

<i>P. styloporum</i>	<i>C. bellistata</i>	<i>Spermastus</i>
<i>P. flabellum</i>	<i>L. perplana</i>	<i>C. scitulus</i>
<i>Pal. constricta</i>	<i>Lox. laevi</i>	<i>P. rana</i>
<i>M. concentrica</i>	<i>H. dehayi</i>	<i>J. carinatus</i>
<i>A. princeps</i>	<i>A. spiniferoides</i>	<i>A. granulosa</i>

95'95" - 100'100" - 74 paces - Coarse shale like that at the bottom of the Pleurodictum bed. A hard layer occurs about in the upper 3' of the interval. The calcareous layer with *P. styloporum* was not noted.

100' 100" - 105' 105" - 62 paces - This brings us to the base of a low falls 24 feet high. At the bottom the shale is finer than in the *Pleurodictyum* bed; it more resembles the Ledyard and probably represents the shale between bed "m" and the *Pleurodictyum* bed fossils are:-

S. pennatus

C. scitulus

105' 105" - 110' 110" - *S. pennatus* *C. scitulus*, *C. bellistriata*, *C. setigerus*. Fossils are not abundant.

110' 110" - 115' 115" - same

115' 115" - 120' 120" - same

120' 120" - 125' 125" - same

125' 125" - 130' 130" - 27 paces

Shale is coarser -

J. carinatus

C. bellistriata

130' 130" - 135' 135" - 28 paces

M. concentrica

C. bellistriata

J. carinatus

A. spiriferoides

The shale here is coarse, like that of the Earlville, and breaks into large uneven slabs.

135' 135" - 140' 140" - 55 paces

S. pennatus

C. bellistriata

J. carinatus

A. granulosa

A. andascula

M. subulata

P. lana

at the top of this page the shale is softer with a different fauna:

C. scitulus

M. pygmaea

E. itys

N. triquetra

L. laevis

N. lisata

S. pennatus

N. corbuliformis

C. bellistriata

Loph. lani.

J. subemarginata

N. oblongatus

Pal. constructa

140' 140" - 145' 140" - 55 paces - soft sandy shale
like that at top of 135. *B. crenistria*

145' 145" - 150' 150" - ~~similar~~ 75 paces - similar
shale

I. cainatus & *S. pennatus* *C. bellistincta*
C. spiniferoides *P. oxyphus* - *C. elongata*
Pall. concentrica *A. granulosa*
small concentrations are abundant

150' 150" - 155' 155" - 58 paces - same shale
and fauna

155' 155" - 160' 160" - 50 paces - same shale

160' 160" - 165' 165" - 48 " same "

165' 165" - 170' 170" - 70 " " "

with *Elphidium spiniferoides* common

170' 170" - 175' 175" - 50 paces

175' 175" - 180' 180" - 20 paces - This brings
us to the base of the big falls at the
bridge.

180' 180" - 185' 185" - same shale

C. bellistincta *S. pennatus* *C. cainatus*
I. cainatus *P. oxyphus* *C. spiniferoides*
M. concentrica

185' 185" - 190' 190" - same

190' 190" - 195' 195" - same

195' 195" - 200' 200" - " shale a little

coarser here

200' 200" - 205' 205" - No fossils found

205' 205" - 215' 215" - At the top of 215 this shale
is coarser weathering blue and has

I. cainatus (large) *C. scutellus*
S. pennatus *C. coronatus*

This has a strong resemblance to the Deep Run
215' 215" - 220' 220" - comes the bridge - the
shale in this interval has large *I. cainatus*
and whole appearance of shale is
that of the Deep Run. Other fossils
are apparently rare.

220' 220" - 225' 225" - coarse shale ^{interval under} bridge
 225' 225" - 230' 230" - The very top of 230 brings us
 to the base of the Portland Point. The rock
 below the univodal ls. is very coarse sandy
 shale, nearly a sandstone.

The Ludlowville of the Clithaca region
 proved too uniform lithologically to split
 up. Cleland's zones could not be successfully
 demonstrated in the field. The upper 20 or
 more feet bears a strong resemblance
 to the Deep Run shale but it could not
 find where the Bellona ended and the
 Deep Run began. Apparently a single
 name, the King Ferry, will serve to
 designate this rock above the Ledyard
 shale. The Payne creek section is an
 ideal type locality for the Ledyard.

230
 18
 112
 151

1927

August 11.

King Ferry.

(Railroad - 5° 5' (400 - 405° 5') - covered
 405° 5' - 410° 10' - Dark arenaceous shale at bottom
 of step has layers nearly completely composed of
 shells and crinoidal debris.

C. coronatus *A. undacula* *Platyceras carinatus*

A. granulosa

The top of this step brings a falls 16 feet
 high. The following fossils were seen in the
 rock of the falls.

C. viduus (?) *C. scitulus* *S. pinnatus*

I. carinatus

410° 10' - 425° 15' - The falls is 16' high at the
 The rocks of the falls have very few fossils
 composed of dark green sandy shale.

M. concentrica

C. bellistriata

A. princeps

Cyp coral

Actinophis

A. spiniferoides

P. flabellum

Par. Ham.

425° 25' - 430° 30' - Coarse shale.

A. spiniferoides

M. concentrica

S. pinnatus

C. bellistriata

M. bellistriata

Pal. constriata

P. rana

M. pygmaea

L. perplana

C. scitulus

I. submarginata

P. obiformis

Taomurus

P. tenuis

C. coronatus

430° 30' - 435° 35' -

S. pinnatus &

L. perplana

I. carinatus

C. bellistriata

P. radiata

Pal. constriata

M. oblongatus

C. scitulus

M. pygmaea

$$\begin{array}{r}
 500 \text{ } 100 \\
 440 \text{ } 20 \\
 \hline
 60 \text{ } 80
 \end{array}$$

435'35" - 440'40" - same shale
C. bellistriata *S. rectum* *S. perratus*
A. spiniferoides

440'40" - 445'45" - same
 This brings us to a large falls over the
 Portland Point. The falls is 67 feet high.

445'45" - 450'50" -
N. oblongatus *C. bellistriata* *S. perratus*
N. lirata *N. pygmaea* *S. capillaria*
 Fossils do not seem abundant here

450'50" - 455'55" - same

455'55" - 460'60" - same

460'60" - 465'65" -

<i>S. perratus</i>	<i>N. triquetra</i>
<i>C. bellistriata</i>	<i>N. bellistriata</i>
<i>C. scitulus</i>	<i>T. carinatus</i>
<i>A. spiniferoides</i>	<i>P. radiata</i>
<i>G. obsoleta</i>	<i>Pal. constructa</i>
<i>I. perplana</i>	

465'65" - 470'70" - same

470'70" - 475'75" -

<i>A. spiniferoides</i>	<i>A. granulosa</i>
<i>S. perratus</i>	<i>C. modesta</i>

475'75" - 480'80" - 485'85" - 490'90" - 495'95" -

500'100" + 1 1/2' to base of Portland Point. Falls
 is thus 67' high to the base of the Tichenor

Portland Point

Just 5'5" of this layer consists at the
 base of 2 layers of coralline stone, each
 about 10" thick, followed by alternations of
 calcareous shale, shaley ls. and sandy shale

$$\begin{array}{r} 12 \\ 9 \\ \hline 21 \end{array} \quad \begin{array}{r} 28 \\ 4 \\ \hline 32 \end{array}$$

Spitzer Marag' zone

~~11~~ ~~12~~ ~~13~~ 14

O⁻ & Dehydration

~~19~~
~~4/8~~ Modiollo zone
2

3-4

~~4
5
5
5
5
5
7~~

10' *Strophodont* -
Coralline zone

1

36 1/2' A. umbonata

$$\begin{array}{r} 69 \\ 48 \\ \hline 21 \end{array}$$

22

$$\frac{27}{26} = 1.038$$

sandy shale 5-6' Chonetes zone

"cylindrical" rock Transition zone
shale 2' — Onthousta zone

Portland Point 10'

The Portland Point occupies 9 or 10' and is followed by $1\frac{1}{2}$ - 2' of shale, rather soft, sandy containing, *I. cuneatus* a, *A. erectum*, *C. mucronatus*, *H. capillaria*, *B. leda*, *M. concentrica*, *M. oblongatus*, *Cran. ham.*, *C. beclistiata*, *Pal. constricta*, *sch. ellipticus*, *A. spiniferoides*. This may represent my Kashong shale. It is followed by a 3" calcareous layer containing:-

<i>C. mucronatus</i> a,	<i>I. cuneatus</i>
<i>S. pernatus</i>	<i>P. patulus</i>
<i>A. erectum</i>	<i>H. triquetra</i>

Sandy shale follows the thin calcareous bed up to the base of the Ambocoelia zones. The top of the sandy shale bed is 3 or 4' below the top of the 4th H.L. step.

Fossils of the Ambocoelia zones

<i>Pal. constricta</i>	<i>C. boothi</i>	<i>Pholidops ham.</i>
<i>C. mucronatus</i> c	<i>C. setigerus</i>	<i>A. spiniferoides</i>
<i>P. rana</i>	<i>Pal. plana</i>	<i>Amplexus</i>
<i>Cyst. ham.</i>		

At 54' above the base of the Portland Point is a layer of small concretions above which I did not see *A. umbonata*.

Strophodonts - Coralline zone - In a large concretion $6\frac{1}{2}$ ' above the top of the *A. umbonata* zone were seen:

<i>D. consobrinus</i>	<i>A. spiniferoides</i>
<i>A. reticularis</i>	<i>A. ambacula</i>
<i>R. vanuxemi</i>	<i>P. rana</i>

The fossils of this zone go about 10' up. The shale above the S. coralline zone is rather dark. From the top of the *Strophodonts* coralline zone to the base of the Bully is 69'. At 49' above the top was seen a layer of concretions. The total thickness of the Moscow is thus 134' including the Portland Point member.

L. laura was noted from the uppermost concretionary to the 30' below. There is about 4' of black shab, 2' of it being transitional to the lower zone.

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1927

At about 28' below the Tully comes the *A. praerubrona* zone in a dark soft shale. The fossils are:—

L. kama
N. oblongatus
C. boethi
Orthis sp.
C. mucronatus

A. praerubrona
J. submarginata
P. discoidium
S. tullius

Aug. 16

Portland Point

There are about 35' of Ludlowville rocks exposed below the Tichnor here. There are a massive dark shale very much like the soft shales below the Quincy beds at the Gym quarry. Fossils do not seem to be numerous in these but *C. bellistriata* and *A. spiriferoides* are abundant.

At 115 ^{paces} steps comes the 6" transition ls. and below this comes the *Orthis* zone.

In the *Orthis* zone I found no *Orthis* or other great abundance of *Pelecypods*. There are however a very great many of *J. carinatus*.

The beds above the Encinal I found to be 7' 9" thick.

The first *Ambocoelia* zone occurs at about 200 paces up the ravine, and at 214 paces the *Chonetes lepidus* zone is about 2' above stream level.

At about 250 paces around 2nd bend in stream comes the 2nd *Ambocoelia* zone.

At 368 paces and 4' above valley floor Ambocoelia + Pholidops are still present at 417 paces is seen the first of the Strophodonts. Coralline zone.

The Strophodonts-coralline zone passes into the M. pygmaea zone between 450 + 463 paces. The M. pygmaea zone continues to 890?

873 paces comes the septarian layer near the top of M. pygmaea zone.

916 paces is a concretionary layer with the following fossils:-

L. laurus

M. corbuliformis

M. pygmaea

O. lodinensis var. media

R. vanuxemi.

A. praecumbens

Much pyrite

M. subulata c

C. scitulus

S. minutum

A. spiniferoides

(930) paces comes the A. praecumbens zone and 28' above this is the Tully. and at about 1000 paces the Tully would come. I make the Tully about 2 1/2' 6" in the Glen. It is composed of several very heavy layers of massive, much fractured ls. The bottom layer is 5 or 6' thick. Near the top are bands of somewhat shaly ls. It is terminated by a hard layer 1/10" thick. On this for 5 or 6' come alternations of black shale and limestone belonging to the Genesee.

The transition zone contains abundance of L. laurus and this is found in association with A. spiniferoides, and A. reticulatus to at least 15' below the Tully. Also near this horizon the shales become more calcareous and in the Cystodictya zone there are several

Bands of ls. The shale for about a foot below the Bully is somewhat blarker than that in the *Aptodictya* zone. *S. pennatus* is abundant at the contact.

Shurges Glen

Portland Point.

Aug 15

Ichenor

Hard, xlm grey ls. forming a falls in stream east of the cement works. The Ichenor Fossils varies from 8-13" thick

*I. cuneatus**C. congregata**B. p. roa**V. pustulosa?*

On the Ichenor come massive beds of crinoidal ls. with shales. The lowest layer is about 21" thick

*M. concentrica*Large *Orthis* sp.*P. rana**C. bellistata**E. granulosa**A. spiniferoides*

On the ls. is a shale about 2' and very calcareous. At 96' passes is a layer of ls. 6" thick. This has *R. vanuxemi*, *Penestellid*. At 118' passes about 1 1/2' of calcareous shales are mounted by about 1 1/2' of sh. and this by about 5-6" ls. The 1 1/2' of sh are dark blue grey. At 146' passes this ls goes under the stream and the ls. below the 1 1/2' of shale belong to the Encinal and are 8' thick according to Cleland.

Fauna of 1 1/2' shale - *Orthis* sp. etc.
The shale is rather soft, breaks easily and is blue grey in color

10' *Strophodont corallina* zone

a. reticularis, a. spinosa

45'
2nd
Chronetes
1st Ambrosia zone

10' Chronetes zone

1/2' ls. Transition zone
1/2' sh - *Orthostoma* zone

ls & shale alternations } 8' ?
Fischer ls.

D. caimatus cc*S. pennatus* c*Pal. constricta* c*S. capillaria* r*Goniophora* sp. r*P. radiata* r*B. leda* r*D. bellulus* r*A. umbonata* r*Gymnysia* sp. r*N. corbuliformis* r*C. scitulus* r*N. triquetra* r

6" ls. band on the *Orthis* bed is a hard blue-grey impure ls. with *D. caimatus* c & *S. pennatus* c, also *P. snuta*, *A. spiniferoides*, *Lox. delphicola*

This layer is succeeded by blue grey shales which are slightly gummy and give effervescence with acid. They contain:

C. scitulus cc*Lox. hamiltoniae**C. mucronatus* cc*A. spiniferoides* c*Pal. hamiltoniae**M. pygmaea**Pal. concentrica**Aviculopecten* sp.*P. radiata* c ^{about 3' above} 6" ls. band*N. corbuliformis**S. pennatus**B. cuneata**Orthis* sp.*C. boothi*

About 3' above 6" band is a somewhat sandy band forming a ^{good} fall.

This zone passes into the 1st. *Embocoelia* zone which is in a soft dark grey shale. It contains:-

A. umbonata cc*Pholidops hamiltoniae* c*B. leda**Pal. emarginata**P. radiata* r*Pal. concentrica**P. rana**C. boothi**S. crotalum*

10' above the *Chonetes* zone the following fossils are seen in a dark shale:-

*A. umbonata**A. spiniferoides* cc*P. rana**Pal. concentrica**Cyt. hamiltonensis**C. mucronatus*

C. indenta
S. pennatus
Pholidops ham.
R. vanuxemi

C. bellistriata
Taonurus.
N. corbuliformis

This horizon looks like that at Georgetown. I passed, in going upstream from the 1st Ambocadia zone thru the *C. lepidus* zone and into the 2nd Ambocadia zone without recognizing the transitions.

Between 38-43 feet above the Chronetes zone is noted a local band of ls. with the following:-

<i>R. fimbriata</i>	<i>A. spinosa</i>
<i>M. concentrica</i>	<i>C. coronatus</i>
<i>A. reticularis</i>	<i>M. concentrica</i>
<i>P. asna.</i>	

In the shales at 48' feet:-

<i>S. rectum</i> c	<i>S. andaculus</i>
<i>Cyrtina ham.</i>	<i>S. inaequistriata</i>
<i>R. vanuxemi</i> c	<i>Par. hamiltoniae</i>
	<i>Pal. concentrica</i>

at about 50' above the Chronetes zone comes dark shales. The shales of the *Strophodonta* coralline zone were lighter than those of the 2nd Ambocadia zone. I only noted one concretion in the shales of this zone

zone 7. - *Modiella pygmaea* zone - The shale of this zone is rather dark and is slightly calcareous. It contains:-

<i>D. submarginata</i>	<i>Cyrtolites</i> sp.
<i>Pal. tenuistriata</i>	<i>R. vanuxemi</i>
<i>S. andaculus</i>	<i>C. setigenus</i>
<i>M. concentrica</i>	<i>A. spiniferoides</i>
<i>A. reticularis</i>	<i>N. lirata</i>
<i>S. rectum</i>	<i>C. bellistriata</i>
<i>P. stylopoda</i>	<i>M. pygmaea</i>
<i>A. spiniferoides</i>	<i>Pal. concentrica</i>
<i>R. vanuxemi</i>	<i>N. corbuliformis</i>

H. triquetra *I. carinatus*
 The shales 45' above the Strophodont zone are rather fine & dark.

Fossils are very numerous below the Tully ls here and there is seen no barren or depauperate zone as the fossils of the *Cystodictya* layer run right up to the contact. The fauna observed in the last 9' of the Moscow follows: -

<i>C. incisurata</i> cc	<i>P. rana</i>
<i>S. pennatus</i> ?	<i>A. reticularis</i>
<i>I. carinatus</i> cc	<i>R. vanuxemi</i>
<i>S. andaculus</i> c	<i>Trachypora</i>
<i>C. bellistriata</i>	(<i>Favosites hamiltoniae</i> ?)
<i>C. boothi</i>	(A huge head with <i>A. serpens</i>)
Massive bryozoa	<i>Heliophyllum halli</i>
<i>A. spiriferoides</i> m.	<i>Pal. emarginata</i>
	<i>P. stylipora</i>

Fauna of the shales between 9 and 25' below the Tully -

<i>S. granulosa</i> c	<i>C. bellistriata</i>
<i>A. reticularis</i> c	<i>S. andaculus</i>
<i>A. spiriferoides</i>	<i>Par. hamiltoniae</i>
<i>Pal. fuchus</i> <i>phidops</i>	<i>I. carinata</i>
<i>S. rectum</i>	<i>R. vanuxemi</i>
<i>Pal. tenuistriata</i>	<i>P. rana</i>
	<i>M. concentrica</i>

Between 20 and 25' concretions and pyrite are quite abundant. The latter is present in masses.

Between 25-30' below the Tully, large concretions are rather abundant. At this place there is a c' cascade in the stream.

This includes the *Atrypa* - *Spirifer* and Transition zones

A septarian layer occurs about 54' below the Tully.

Cazenovia Creek.

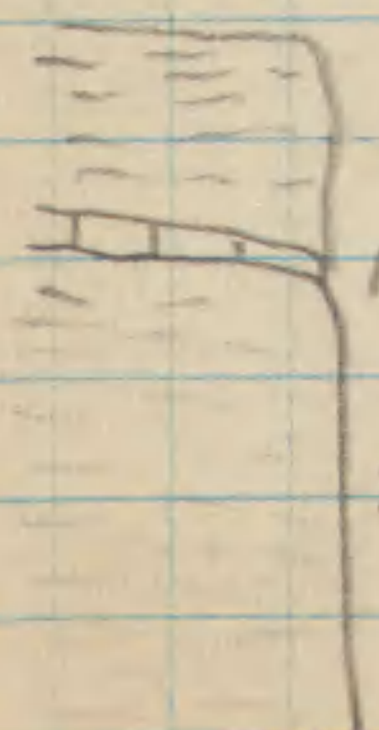
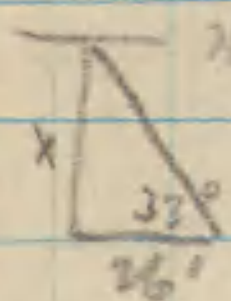
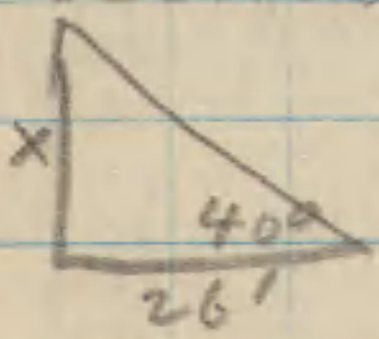
July 19, 1927

100 paces ^{downstream} below the bridge at East Seneca are dark grey shales that weather by crumbling into small chips. These gave no effervescence with acid. These are exposed for about 100 paces and are 8' vertical. The only fossil noted was a small narrow *Leiorhynchus*.

409 paces below E. Seneca bridge shales are exposed in the stream which break into chunky slabs $1\frac{1}{2}$ " thick. They are blue grey in color and have a faint grittiness when crunched between the teeth. They have a somewhat concretionary structure. Fossils noted were: - *C. scitulus*, *A. umbonata*, *C. boothi*. These shales give a positive test for CO_2 but the reaction is not very strong.

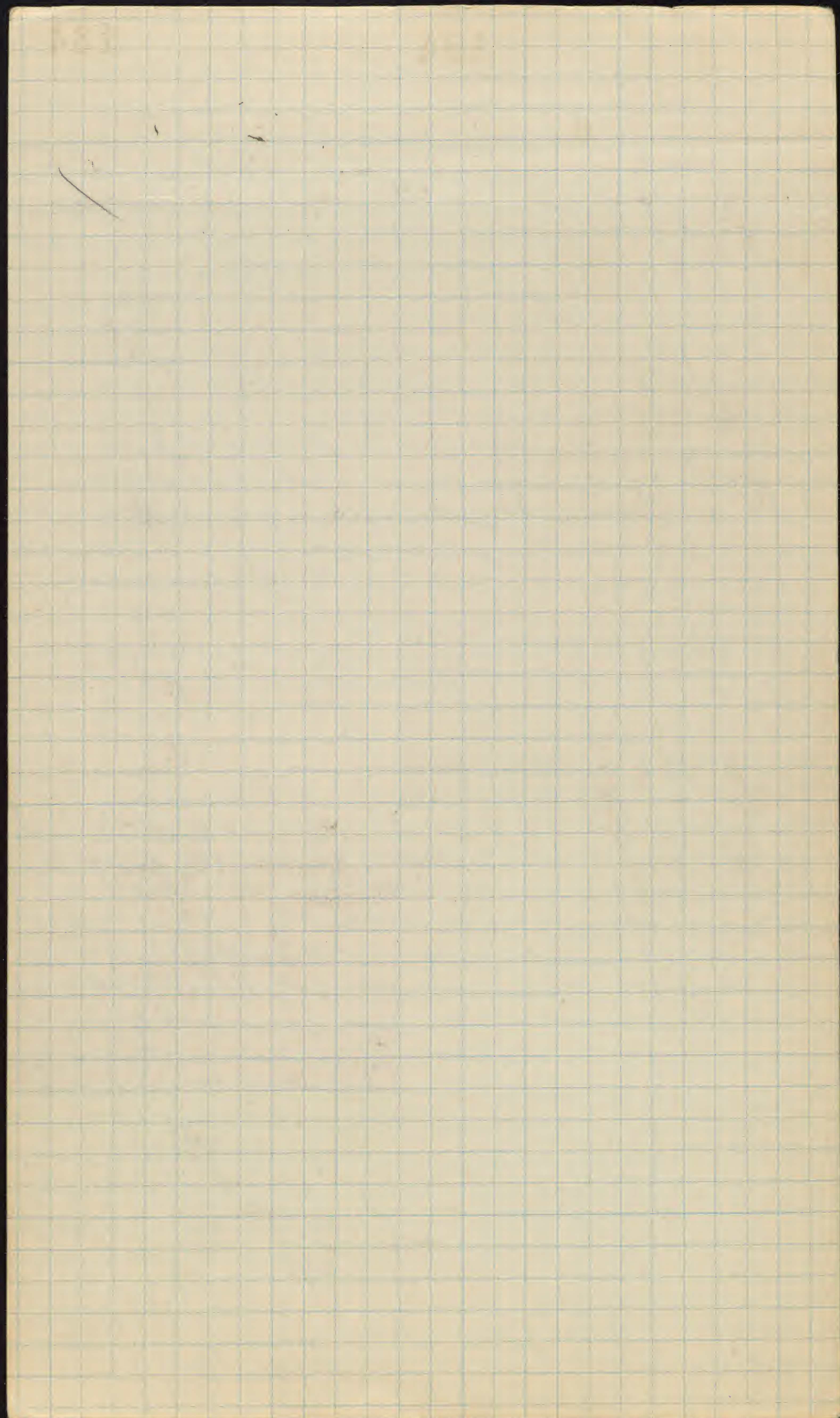
629 paces in stream bed, blue grey shales, the water etched surface of which shows masses of *S. firmella* with *S. pennatus*, *C. setigenus*, *C. boothi*, *C. scitulus*. *Lot. hamiltoniae*.

1226 paces is a sheer face of blue grey crumbly shales about 35' high. At about 20' up there is a hard ledge that stands in relief. It is probably of ls. There are many concretions scattered over the face of the cliff.



Fossils noted about 10' up were *Leiorhynchus*, *Ambocallis*, *C. lepidus*, *C. scitulus*, *P. fragilis*.

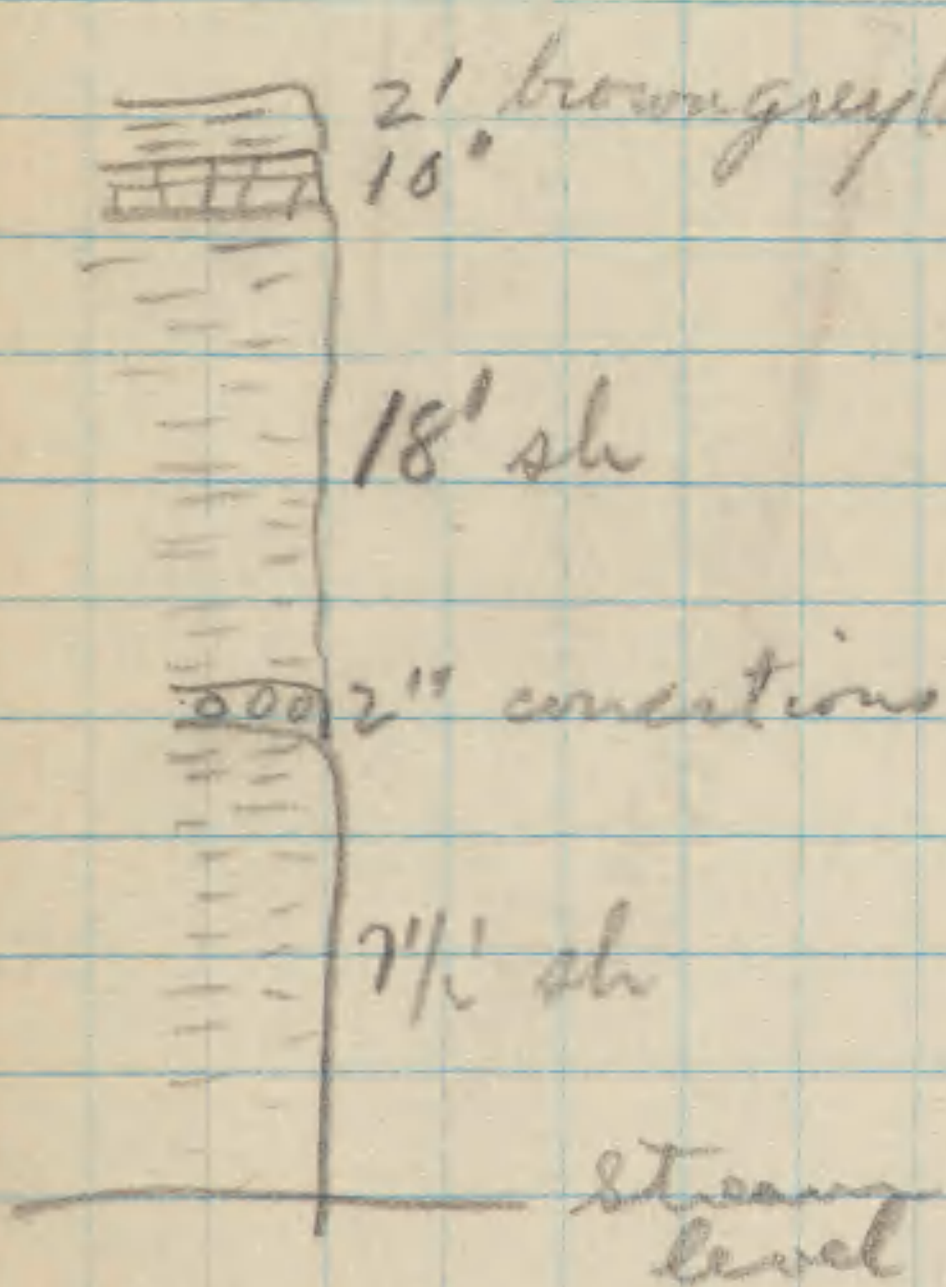
at 1330 paces a line or stratum of concretions may be seen at 6' above stream level.



There can be seen as far as the eye can see in the cliff downstream fully $\frac{1}{4}$ mile.

At 1542 paces a small brook comes in over the upper ls and this permits an examination. On the lowest shales which crumble into small fragments *L. laura*, *A. umbonata* and *C. setigenus* are present. At 7 $\frac{1}{2}$ ' vertically the stratum of concretions is met. They are bedded in a shaley band crowded with fossils such as *C. scitulus*, *A. umbonata*, *Leiorhynchus laura*, *C. setigenus*, *P. punctilifer*. *Ceratopora* corals abundant. The shale next above has *S. fissurella*, 3 $\frac{1}{2}$ ' above this the shale is crowded with *S. fissurella* & has good specimens of *S. pinnatus*.

About 25' above the stream level is the hard band which proved to be a ls of 2 layers the bottom one was of 7" hard but breaks into flattish slabs when struck. It does not contain many fossils. In it we noted *N. triquetra* & *B. ledi*.

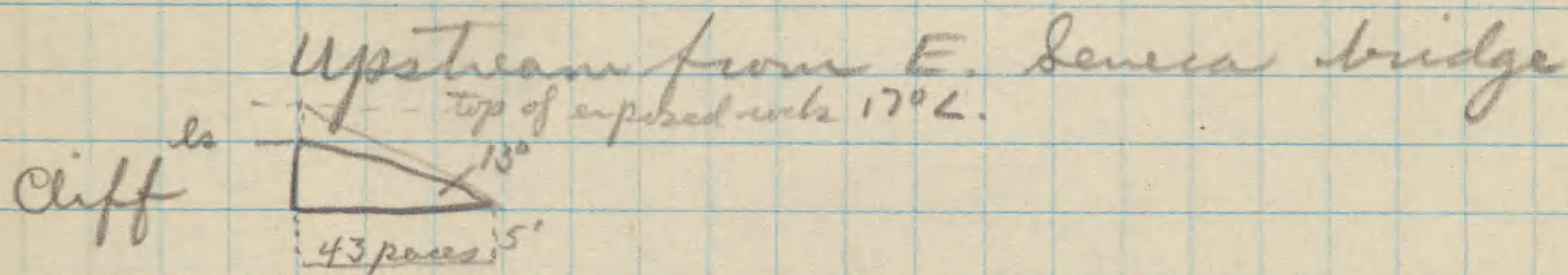


The three inch layer was more fossiliferous containing *C. setigenus*, *Prodrustella*, *N. triquetra*, *N. oblongatus*, *P. punctilifera*, *L. laura*?, *Orthoceras* sp. This sh is succeeded by a brownish grey stone which is much softer than that below. Fossils in it are rare, *Ostracodes*, *S. fissurella*, *Chonetes* (small) In the stream bed it has a concretionary structure.

Exposures on south bank

2675 paces downstream purplish grey shales are found in a cliff 20' high but there is no sign of the Centerfield ls. This will be visited on the way to Blossom Wednesday, when the ls a bit ^{173 paces} further downstream from 1542 paces another gully shows the section, where found many specimens of *Phanerotermis laevis*.

According to Luther's map I should have met the the Centerfield ls after having travelled about a mile. However no sign of it was seen just grey shales were met continuously.



A cliff at the bridge is exposed on the north side of the Creek about 30' vertical to ls. band standing in relief. Stone in the brook here is rounded and pitted by solution but where exposed to the weather it crumbles. This may be the ls with *Strophomena*? as it had not yet been noted to cross the stream.

The shale in the cliff near the stream is blue-grey on surfaces but very dark grey in cross-section. It is only slightly calcareous. *S. fissurella* was not ed in the rock.

A block of ls in the talus on the stream bank had a *Eumorpholites*-like Gastropod which may be *P. laevis*. At any rate the stone is of the same kind as that found below the bridge.

The dip must be very small here because the ls should have crossed the stream. The stone is 29' above stream level here by hand level. The stream must be cutting " to the strike of the beds. It is an east-west stream. The rock below is like that below the bridge. The ls here is only 6 or 7" thick.

Where the road turns south to cross the bridge the ls ledge is well displayed and *S. rudis* is common here.

There are 2 kinds of concretions & also a combination of both. There is a small nodular to tubercular kind of pyrite showing octahedra of pyrite on the surface. The other is a large rounded calcareous concretion of hard ls. This kind contains well preserved specimens of *Ambocoelia*, *Leorhynchus* & *Cratopora*. A third kind is a calcareous concretion containing pyrite.

Ludlowville section Cozenovia Cr.

Tichenor ls.

30 1/2' ?

6" m. subalata bed?

shale 6' ?

- ls 3 1/2'

shale ls. 6" with Pioneris

3' sh

- ls 4" discontinuous terebratulids

5' shale with A. spiniferoides, P. stylopora

7" 6" ls.

30' 4" shale

10" ls with Strophomena rudis

18' sh with L. laura, Ambocoelia etc.

2" concretions + sh with Ceratopora, Leiorhynchus

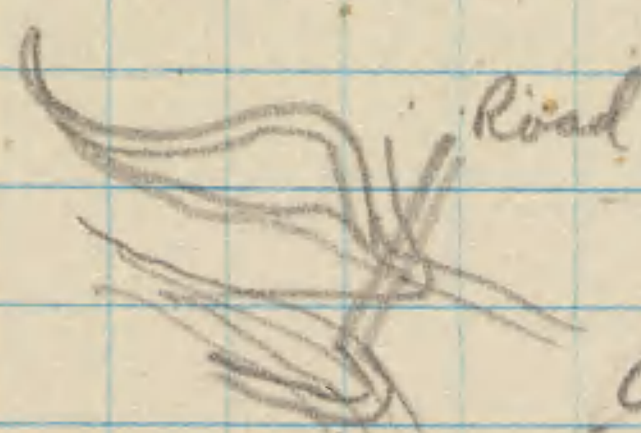
7 1/2' sh with L. laura, S. fissurella, Ambocoelia etc.

- Stream level.

There are probably 10'-15' more shales below when the Ebenezer section is studied.

Ludlowville Section

At point b on the map there is a small island just where road crosses the stream. A bridge is marked on the map but there is none here.



At this island and forming a ledge in the stream is the ls. band with *Straparollus*. On the south fork of the stream around the island there is a 60' cliff of Ludlowville which can be measured at least part way up.

The *Phanerotinus* band here is 8" thick composed of 2 layers, the lower one of which is 6" the upper one 2". The lower contains *Phanerotinus* & *S. subulatum*.

On top of this band comes 30' 4" of dark grey shales which are somewhat calcareous. On these is an 8" ledge of ls. that forms a cascade in the stream above, then 20-30' more shale, with 2 ls bands about 10' apart?

Where the streams fork to go around the island the *Phanerotinus* bed forms a large bare shelf of ls.

Just on top of the *Phanerotinus* bed small *Chonetes* are common, about 15' up (500 paces from stream fork) the following were found: -

P. rana cc
S. pennatus cc
C. boothi c
C. setigerus

P. inuitopsis punctifera
 Other *Ostracoda*
A. spiriferoides

At 863 paces the 6" band of ls. is only 6" above the creek level. It contains an abundance of small *Ambocoelias*, *S. pennatus*, many *Ostraceras*, and 2 *Phanerotomas*. *Strophalosia* bed?

At about 875 paces a small gully shows three feet of shale above this 6" of ls. a dark grey shale weathering to a light blue grey. In this A. *Spiniferoides* makes its appearance together with bryozoa. Large *S. pennatus* 5" 1" above the 6-7" ls bed comes another 4" thick crowded with fossils mostly bryozoa, in this were found *P. rana*, *Schizophora* sp., *Productella* *S. perplana*, *C. mucronatus*, *Schuchertella puposa* *Trilobatulids*, small *Athyris* (cora?). The "beach" at 900 paces contained many *P. stylopora*, possibly from the bed between the 7" & 4" ls. In the 4" ls. also *R. fimbriata* *Aviculopeeten* sp. *A. decussata* This ls. is discontinuous and thickens & thins rapidly.

Fauna of shale bed between 8" ls & 4" discontinuous bed: -

<i>P. stylopora</i> cc in place	} The 2 together
<i>Streptelasma</i> c	
<i>A. spiniferoides</i> cc	<i>A. umbonata</i> c
<i>P. rana</i>	<i>P. flabellum</i> v
<i>S. pennatus</i> c	<i>C. boothi</i> , <i>T. carinatus</i>
	<i>S. granulosa</i> v

The *Pleurodictyus* are upside down or oblique or with the cups vertical. The *Pleurodictyus* range thru 2 or 3 feet of shale just below the discontinuous band of ls.

The next bed is 3' of soft crumbly shale with many fossils

A. spiniferoides
R. penelope
S. perplana
S. pennatus

A. umbonata
 Many bryozoa
Streptelasma
S. concava

A. bulbosus
S. angulatus
C. boothi
P. rana

A. decussata
S. granulatus

Then follows 6" shaly ls with
P. iowensis c ✓
P. rana cc
 Corals ✓
S. concava ✓

Ambocoelia ✓
Sphenotus ✓
C. boothi
R. vanuxemi ✓

Then 1' shale with *A. spiniferoides*
S. pennatus cc, *P. rana*, *Paleoneilo tenuistria*
A. umbonata

Then 2" shaly ls with *S. pennatus* &
P. rana. followed by shale.

This is the same as the section on
 Avery's Creek below the second dam.
 The hard band below the bed
 of *Pleurodictyum* must be
 equivalent to the *Strophalosia* bed or
 near to it.

On the shales following are *S.*
fissurella, *S. pennatus*, *P. rana*. At 1213
 paces the shales are very argillaceous
 and faintly gritty. They contain
P. punctilifer, *S. pennatus* with
 long wings & without, *Pholidops*,
 and *Chonetes setigerus*. This is the
 same as was noted below the
 Tichenor at the Lake Shore. *P. rana*
M. subalata. This must be Grabin's
M. subalata horizon. The *Modiolomorpha*
subalata horizon is below the
 argillaceous shales with *Ostracods*

As a brittle shaley ls. about 6" thick. It is about 5 or 6' above the 2" ls band. The fauna of this band is *M. subulata*, *P. concentrica*, *P. rana*, *S. pennatus*. At 1245 paces it crosses the Creek.

The shales on the *M. subulata* bed have beautifully preserved *S. pennatus* and *P. rana*. At 1950 paces the Tichenor is in sight about 20' above stream level. The fauna here is predominantly one of *S. pennatus* & *H. spiniferus*, the former the more abundant. A *Levithynchus* was found.

At this point the hand level was used up to the Tichenor and gave 24 1/2' to the bottom of the stone. *B. beds* was found a foot and a half below the Tichenor.

Fauna of shales in 8' below
Tichenor

S. demissa
A. spiriferoides
S. pennatus
P. flabellum
A. reticularis
S. perversa
A. princeps
C. boothi

L. delia
R. fimbriata
a large *Spirifer*
S. perplanus
C. setigerus
Stictopora byzozoa?
Chaetetes
R. vanuxemi
S. granulatus

The shale below the Tichenor when
fresh is quite dark and is not calcareous.
C. scitulus *I. cunicatus* (transverse)

30	6
6	6
	2
1	6
3	4
5	6
<hr/>	
45	30
<hr/>	
47' 6"	

30

6

1

3

5

45

407'

6

2

6

4

6

24

July 20, 1926

Note from Placerotinus bed to
Springbrook bridge was 3760 paces

West of bridge just south of Ebenezer
are exposed shales for about 200 or
300 yards ^{+ 100' high} they are essentially bluish
gray shales

Brownish gray in appearance on surface
of weathered clumps but a dark gray
in cross-section. They give no effervescence
with acid. The fauna is sparse.

Fossils noted:-

P. rana

P. lanna

L. arctostriatus

C. setigerus

L. fissurella

P. punctilifera c

Ostracods c

Cratogeomys

East of the Ebenezer bridge 200 paces
upstream the shales are of the same
kind in weathering but are a more
bluish gray and are slightly calcareous.
The section here is about 22' high
above the stream level. Some of the
cliffs here abound in *Ostracoda*.

500 paces east of the Ebenezer bridge
and about half-way between it and
another bridge, west of East Seneca the
Cliff is about 30' high and is capped
by a ledge about 10 inches or a
foot in thickness. Some debris from
this ledge yielded *P. latus*. Where the
Shaverston comes in in this section
it cannot make out, it should have
seen the Centerfield long ago if it is
here. If he knows the like at the
Placerotinus bed the contact
should appear further upstream.

This is just contrary to J. J. J. J. J.
report of the Shaverston bed.

Fossils noted here are

Ostracoda

C. lepidus

P. fragilis

Lecanospira

One half mile east of Ebenezer is a second bridge below which the stream has been dammed back. There is an island in the middle of the stream just above the dam. Here the shales are of the same nature as those below but the calcareous band is not exposed. Shale blocks under the bridge afforded some opportunity to examine the fauna & weathering of the shale. The shale crumbles easily to small flakes in some blocks and to chunky chips in others. Fossils are rare but *Ostracods* in layers are abundant, as well as *Strophomena* *O. boothi*.

Note - The ls band with *Phacelotus* must be the equivalent of the Centerfield and must be Luther's dividing line. It, however, should appear farther upstream on the map.

On a gully in the road 12' above the south end of the bridge (at the dam) a harder, blockier stone was found which contained large *Ostracods*. It is thought that this stone is the *Phacelotus* band. This is it certainly for Luther's contact of the Ls I show swings just south of the bend in the road at the south end.

900 - 1800
225
1025 = 68) 342 (5

145

145

of the bridge. This will make the Skenectates here from the stream level to the top of the Phacelites band about 40'

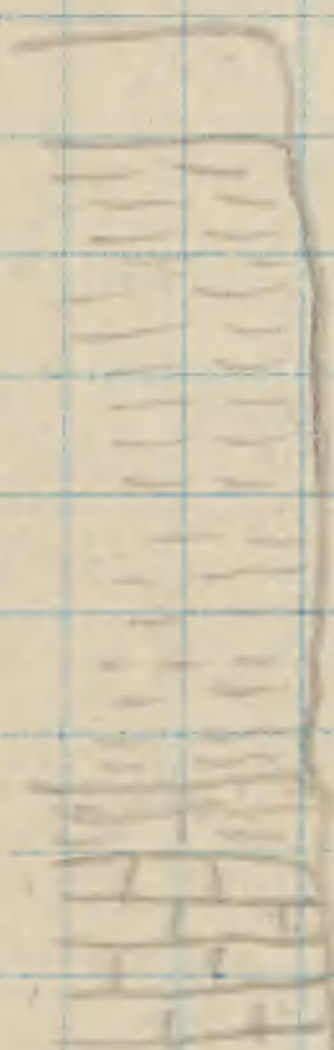
67 1/2

Springbrook Bridge

Ludlowville 4' thick, shale in surface of stream crowded with *A. spinifoides*, *S. pennatus*, and *A. reticularis* in less abundance. *S. demissa* also occurs in this horizon. In the brook the shale channels along the joints just like a ls. 3' 9" below a discontinuous band ls with many *tyozoa* Tichenor

Very thick of several beds. The lowest bed is from 20 - 23 inches thick and has on its lowermost or Ludlowville surface string, and masses of pyrite, but also cup corals and *S. rosita* heads. The next layer varies from 4 - 3" in thickness and is a gray crinoidal stone. The third layer is the same and a fourth likewise. Upon this is a layer about 1' thick and containing much shale. It also splits up into irregular rounded masses. This probably belongs to the Moscow. The typical Tichenor here appears to be about 2' 10" thick, 3' 10" thick if the shaley stuff above is added. An *Orthis* 1 1/2" long was observed in the Tichenor, also a large *Cryptonella*.

Moscow Section



21" blocky ^{continuous with} shale breaking into stocky slabs *Staptelasma*

6' shale - crumbly

Shaly limonoid stone 1"

Pickover 28" - 34"

Tichenor Is - Cozenovia Creek

Exposed about 50 yds upstream from the highway bridge. The stone consists of several beds of stone varying in thickness and in lithologic character.

The lowest is a grey ls. containing considerable clay and much pyrite. It is 6-8" in thickness. It contains many bryozoa and also Favosite heads, one about $1\frac{1}{2}'$ across. It contains also fragments of Crinoid stems, + cup corals. A favosite head in this lower bed measured $2\frac{1}{2} \times 3'$ across the top.

On this are 5" grey ls. with a greenish cast having much the appearance of the Onondaga. Then 4" of very hard grey crinoidal ls. with pyrite. These beds are very variable and when one thickens, or thins the other does likewise. The last + upper bed is of a lighter grey, is 11" thick and is marked all over by large Crinoid stems which are at times about $1\frac{1}{2}"$ in diameter. The upper bed also contains large heads of Favosites. The total thickness is about 28"

$11 + 5 + 8 = 28"$

Species observed in the Tidewater

*P. rana**D. sculptilis* ✓*D. carinatus* ✓*D. lineatum**A. decussata**A. spiniferoides* ✓*P. iowensis* ✓*F. hamiltoniae* ✓ sub-*Craspedophyllum caespitosum* ✓*S. granulosa* ✓*R. fimbriata* ✓*S. concava* ✓*Platyceras**R. penelope**D. exigua* ✓*P. oviformis**Camatoechia* sp.*Aviculopecten* sp - possible *exacutus* ^{not}*Trochypora limbata*

Moscow.

About 150 yds east of the Springbrook bridge (C) in a dry water course on the North side of a small island the shaley ls on the Tichenor can be observed. It is a rough ls with containing shale pockets and many crinoid stems. Indeed the masses of crinoid stems are the resistant members the shale being corroded away. Masses of pyrite also occur. Fossils are abundant, especially *Stictopora*? *Bygonia* and *Genestellids*, also *S. inaequalitatis*, large *Platycerids*, *S. pinnatus*, large *Spirifers* etc and *Rhipidomella vanuxemi* are common. A similar condition is found in the Moscow in Madison Co. where crinoid stems & lenses of crinoid debris, as well as *R. vanuxemi* and large *Platycerids* are found on the "Crinoidal band".

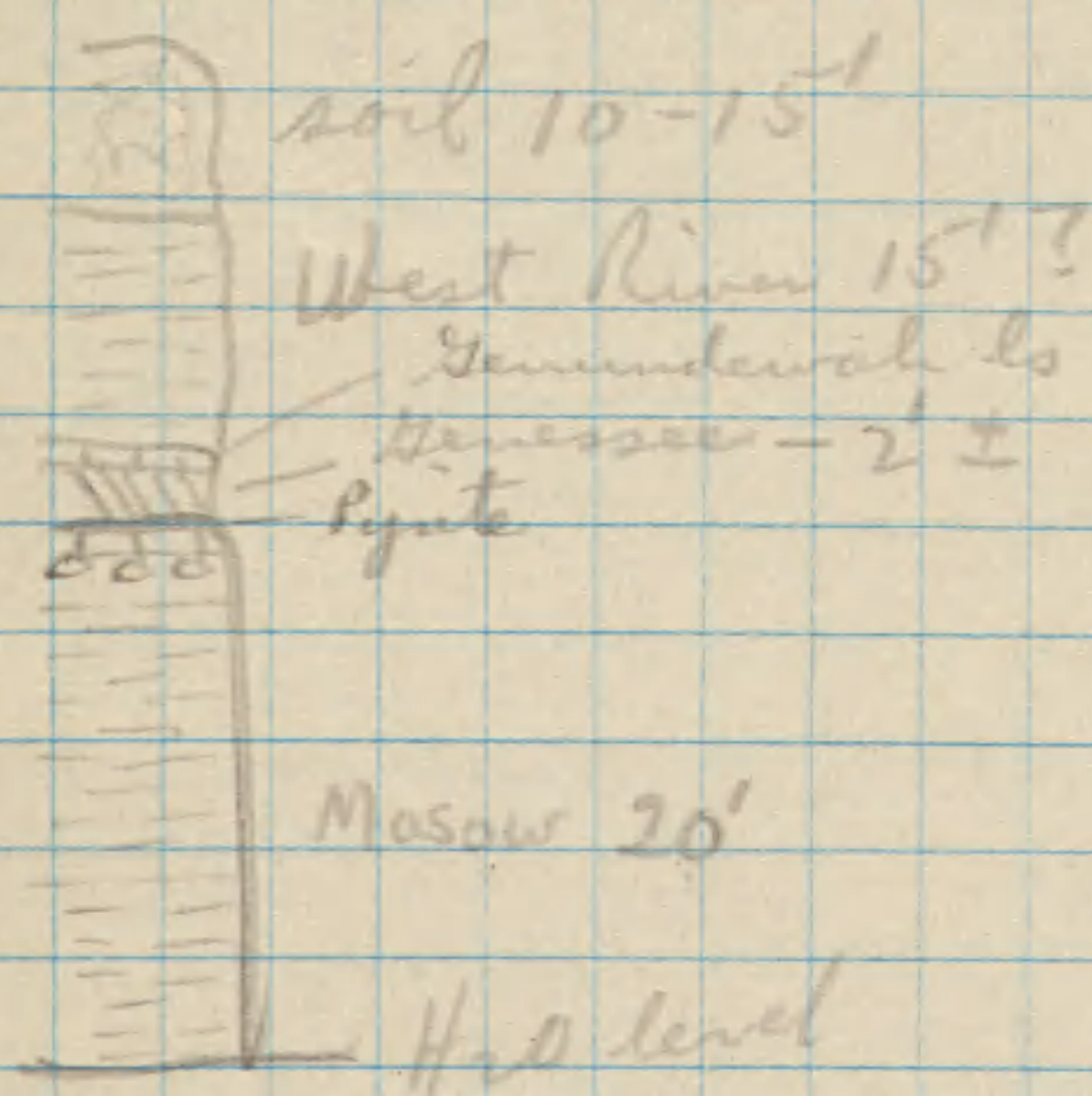
On this shaley crinoidal stone are 6' of limy shales which crumble into thin flat fragments. It is grey in cross section.

On this 21" shale, calcareous, breaking into heavy slabby, irregular pieces. Fossils *R. rara*, *C. boethi*, *C. communis*, *A. umbonata*. Placoids here is much larger than those below.

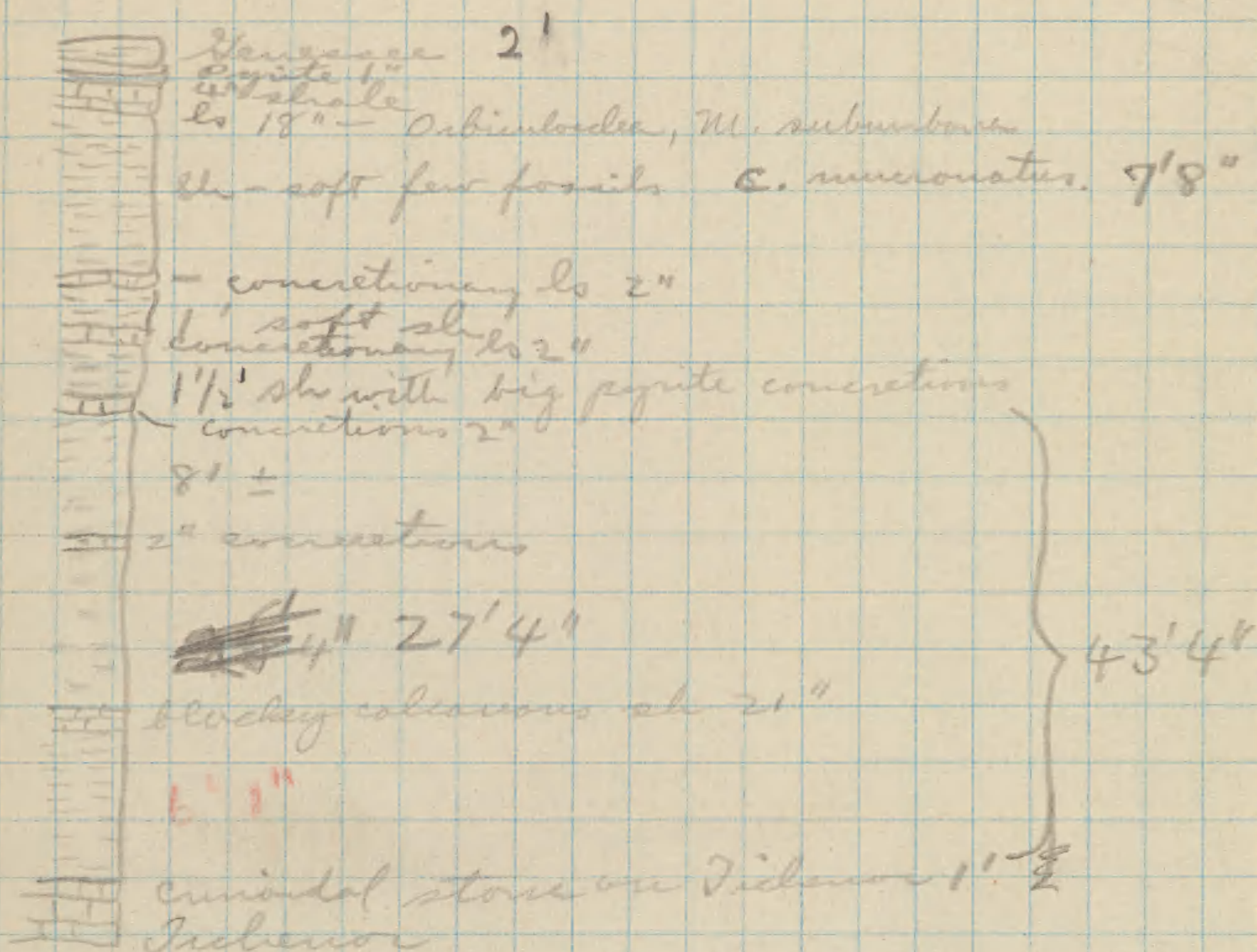
Above the 21" band the shales are still slabby, of a ~~dark~~ grey with a faint brown tinge to them on the weathered cliffs but a dark grey in cross-section. So far fossils have been rare.

At 147 paces from the end of the island the lead band crosses the stream. Here it has *Strophomena* corals as the lower lead band did at 18 mi. E. The only other fossils found were *C. setiformis*, *C. brachy*, *Parnia* c.c., *P. Stylogonia* about 6" below the band.

Crude section sketched at D



Moscow Section



Total thickness 56' 7"

~~1~~
 1
 7
 1
 1
 1
 8
 27
 1 53
 6
 1

 55
 3 11"

 58' 11"

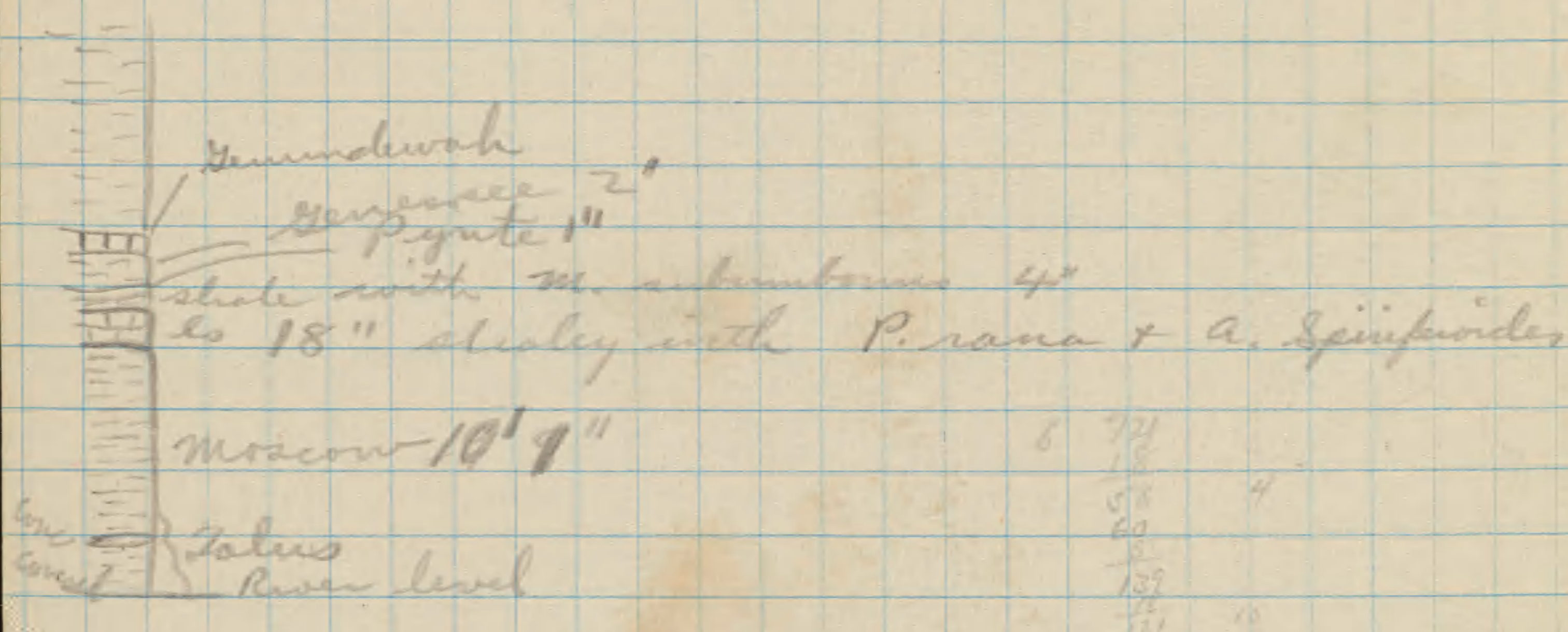
~~1~~
 4
 6
 8
 2
 2
 6
 2
 2
 4 12) 46 (3
 9
 1

 47 = 3 11"
 46
 53
 3 11

 56 11"

1	4
43	6
1	2
1	2
7	8
1	6
	4
<hr/>	
54	32
2	8"
<hr/>	
56' 8"	
56' 10"	

Section at E



Soft shale of 7'8" has few fossils in it. The shale crumbles readily. Only *C. mucronatus* and *C. boothii* were noted. A doubtful *Leiorhynchus* was seen.

In the 18" band of ls fossils are not abundant but a list follows:

<i>M. subumbona?</i>	<i>Orbiculoidea</i>
<i>P. rana</i>	<i>I. submarginata?</i>
<i>C. mucronatus</i>	<i>Rhipidondella</i>
<i>A. Spiriferoides</i>	

In the 4" bed was noted

<i>C. boothii</i>	<i>Orbiculoidea</i>
<i>M. subumbona?</i>	

In the ls. considerable pyrite was seen. The lenses of pyrite here are flat and elongate varying from 1-5"

The shale for about 10' below the last concretionary bed has practically no fossils, only *Pholadops* bantianae and a small *C. setigera* were noted. The shale when fresh is dark blue.

gray but when weathered is olive in section.

The section as a whole is not very fossiliferous. The most fossiliferous portion is that with the crinoidal fragments.

On the Moscow section the zone of *Cystiphyllum* was not located but it must be present as a *Cystiphyllum vesiculosum* was located in the stream bed.

Luther says that the Moscow shales are everywhere "exceedingly abundant" but this does not seem to be true on Cogenovia Creek.

About 200 yds from the bridge the ls band just under the pyrite is a layer of huge concretions.

- Parenula radians* a
large form from Cazenovia
● incorrectly called *Potens*
at Colgate
-

- *Murela sandalli* = *M. opima*
Hall.
-

- *D. alveata* Leonardville
from the Mattville or
upper Peckaport
-

Sphen. archaeiformis type
from the Delphi of at
Pratts & Delphi Falls

- *D. erectum* - large type
pl. 11, fig 8, pl. 86, fig 6
● is from Delphi - looks
like *Levopteria* - I suspect
● we have both *Actino*-
and *Glyptodesma*.
pl. 11, fig 7 - at Colgate (?)
fig 5-

P. maculatus

Typ - Pl. 8, fig 9 is
labelled from Hamilton
ny. is from upper Colgate

P. undatus - pl. 2, 18
is Moscow or Kasheng

Brachiopod types at
Albany

U. concinna 8, pl. 48, 24, 26.
22, 27, 29

Meristella hastiniae 8, 44, 31.
43, 23, 24, 25

P. luisuta 8, 49, 28-32

Int. 49, 37, 39

Spines. - 36

V. pustulosa -

Camandigua lake 82, 10, 24

Pent. unaulcata biphcata 8, 42, 31

L. perplana 8, 15, 11.

A. spiciferoides 4, 46, 11, 13
8 45, 17, 13, 12,

S. uncinatus 4, 34, 2, 16,
8, 24, 22, 2,
8, 34, 13

S. asper - 8, 25, 25

S. acuminata 4, 35, 24
occurs with a specimen
of *S. divaricata*, on same
block. & *Camarotoechia*

S. maruyi - 8, 22, 13.

S. fulleri 4, 37, 13, 16, 15,
4, 35, 8

S. andaculus 4, 38, 21, 2, 4, 5, 6.
12, 13,
8, 15, 4, 18
8, 29, 5

S. andaculus satoru 4, 38, 12, 17

S. macronotus 4, 38A, 4-6
9 4, 38A, 18

S. fimbriatus 4, 33, 16 - 19

C. spinosa 8, 55, 22
4, 53A, 13

C. reticularis 8, 55, 7

D. inaequistrata 4, 18, 21.

C. praemorsa 4, 44, 6, 2
from praemorsa zone.

P. purpurea 4, 58, 35.
8, 71, 31

C. congregata - 4, 54, 57 -
apparently from Mattville

S. pinna 4, 18, 3c
8, 15, 16

C. coronatus 8, 16, 11, 24,

E. imitator from Delphi

S. concava 4, 16, 1d, 1a
8, 14, 20, 21, 19

Lindstroemia 8, 4E, 25, 26
aspidium 25, 27, 26

O. randalli 8, 4E - 18

Orthocentrus ^{arcti} *cheimys* 4, 9, 7, 11, 17 ^{Reunert}

R. penelope 8, 6A, 10

L. punctata 4, 1, 6f
8, 1, 26, 28.

C. crenistria 8, 4H, 9

L. delia 8, 1, 29.

R. grandis - Coz - 8, 4E-30

Glenarie specimens
are from Glenarie Is.
& Oriskany ss.

SA.

Mesembria - a dalmatites
genus.

Onychaster - first true
ophiurid - does not
appear to be Onychaster
at least the one exhibited

• *Engasterella logani* -
Fenner, N.Y. appears
to be *Delphi* in age.

Long whiplike arms
disk, plated - ossicles suggest
relationship to *Encrinaster*

my blastoid from Kashong
is *Pentrematidia whitei*

• N.Y. St. Mus. Ann. Rep.

15, pp. 149, 150; N.Y. St. Mus
Bull. 69, pl. 1, fig. 1

Early editions of the
Handbook of Birds.
give many genera
to Hall only.

Euroa a crustacean,
according to Ruedemann.

Devonian

Synthetic slab has a
● large number of starfish
associated with a *Grammysia*
called on labels as *G. lamblensis*
Vancouver. The latter looks
● like *G. elliptica*. It does not
have the ridge of *G. bisulcata*
and is an almost smooth
shell. Other fossils with the
starfish are *Diguonia*
alveata, a large *Leiopteria*
~~(or small *Glyptodonta*)~~ and
● as species of *Comasotechia*.
The starfishes run about
● this long ———. The
longest on one arm is
—————. One is im-
● pressed immediately with
the uniformity in size

of the specimens

Anchanodon is used
for the generic name of
Amnigenia catskillensis
must be looked up.

Cryptonella eudora -

Chemung - Althaca, W.V.

July 22

1978

Cazenovia Creek

925 paces above island is a 4-6" concretionary limestone forming a cascade in the creek. This stone abounds in a small variety of *Ambocoelia*. At the contact of the concretionary layer & the shale below *S. tumida* is abundant. This layer is referred provisionally to the *Stropholobos* bed.

C. setigera
S. fimbriata

P. itys
E. subulatum etc.

925

925-1167 - *Plenodictyum* bed-

A. spiniferoides c
S. granulosis
S. rectum
P. strophoporum c
C. setigera
C. scutellus
A. umbonata
A. macronata
R. vancouveria

I. crenatus
P. rana
S. pinnatus c
Taonurus
R. fimbriata
S. junia
A. laudacula
P. covenensis
R. penelope

Lower trilobite bed comes at 1167 paces.

Fossils

P. covenensis c
S. rectum c
P. rana r
A. spiniferoides r
R. penelope r
A. umbonata r
C. bellistriata r
S. rectum c
P. tenuistriata r

P. rana a
C. boothi r
Productella sp. r.
M. subulata r
P. itys r
S. pinnatus r
Conocoecium sp. r
R. fimbriata r
P. rana r

Lower bed about 4" thick.

1317 *Forces* is a poor, dolined calcareous layer 5" thick abundant in *S. pennatus*. It also has *P. constricta* and *P. rana*. This is referred to bed III. At 1317 it is 3' above stream-level.

Fossils seen in the shale between bed "III" and the middle trilobite bed are:

S. fissuella a
S. parvifera a
S. pennatus
M. subulata
C. scutellus

L. lina
C. setigerus
A. unibrachia
P. rana

There is about 6 1/2' of this shale.

Shale between lower Trilobite beds contains bed is 9" thick and contains:

S. pennatus a
C. spinulosus c
P. rana
L. unguis
R. vachusani

A. andacula a
A. unibrachia c
C. boethi
S. aculeus

Concretionary bed - 3".

S. fissuella a
M. subulata
P. rana
C. boethi

S. pennatus
C. setigerus
R. lida

Fossils mostly a.

Middle Trilobite - 6' -

C. setigerus
P. rana
S. pennatus
P. parvifera
S. pennatus

M. subulata
C. boethi
A. unibrachia
B. lida

Trilobite beds are very poorly defined here and appear to be thin. Near the bottom of the *Planochitum* beds is a layer of concretions, and at the contact with the Stroph. bed *Amboecia* of small size is very abundant. The lowest 8" contains great numbers of *Amboecia* cf. *nana*. A few concretions also abound in the same fossil.

Stroph. bed rises about $4\frac{1}{2}'$ in 300' giving a dip of 68' per mile

$$\begin{array}{r} 130 \\ 2 \\ \hline 260 \\ 260 \\ \hline 520 \end{array}$$

$$300 / 5280 = 17.6$$

Reck of paces -

Lower Trilobite bed to Stroph. bed - 0-225

Stroph. bed - *Planochitum* - 225 + 914 = 1139

Remarks on Cayenovia Creek

Cayenovia creek was walked from Ebenezer at Leim's Park (Evangelical Park) to the Seneca St bridge but I did not see the Centerville equivalent. The measurements of last year on the cliffs near Wahl's ~~see~~ Grove are O.K. The *Phanerozoites* bed is at stream-level and the whole sequence up to bed "m" is exposed. The 30 feet of shale between the *Phanerozoites* bed & the *Stroph* bed has few fossils. The typical *Strophalosia* bed was not seen but a layer of concretions containing small *Ambocoelids* are in its horizon. The shale immediately below the "*Strophalosia*" bed abounds in *S. truncata*. Other fossils in the concretionary layer are like those of the typical *Strophalosia* bed. Immediately following the concretionary layer the shale for 8' contains small *Ambocoelids* in great profusion. A similar layer was observed near Snakes creek just above the concretionary layer photographed.

Phanerozoites are rare in the lower two feet of the layer, *S. granulosa* is much less abundant than in exposures to the west. Profusion of *Rhipidondella* was not observed. The *Tillite* beds are not well-defined here but the lower bed is easily spotted by profusion of *P. novaeis*. *Phol* is *shaly* and abounds in *S. perrinites*. The concretionary bed in the *Stroph* horizon dips about $4\frac{1}{2}^{\circ}$ in about 300', and is ^{about} 34' above stream 9167 paces downstream from the point where it is at stream-level.

July 23

Cagenovia Creek

The upper surface of the Tichenor is transitional to the Moscow above for 2 or 3 inches. The fauna is that of the Tichenor.

A. macronota c.*A. spiriferoides* r.

Wood

Platyscras (several sp.)*C. vicinus**A. andacula**D. inaequistrata**T. limbata* r.*C. mucronatus* r.*D. lineatum* r.*A. decussata* r.*P. pavilionensis* r.*A. umbonata* r.

Pyrite in flat masses is abundant where the mass becomes shaly. Crinoid stems and bryozoa also abound.

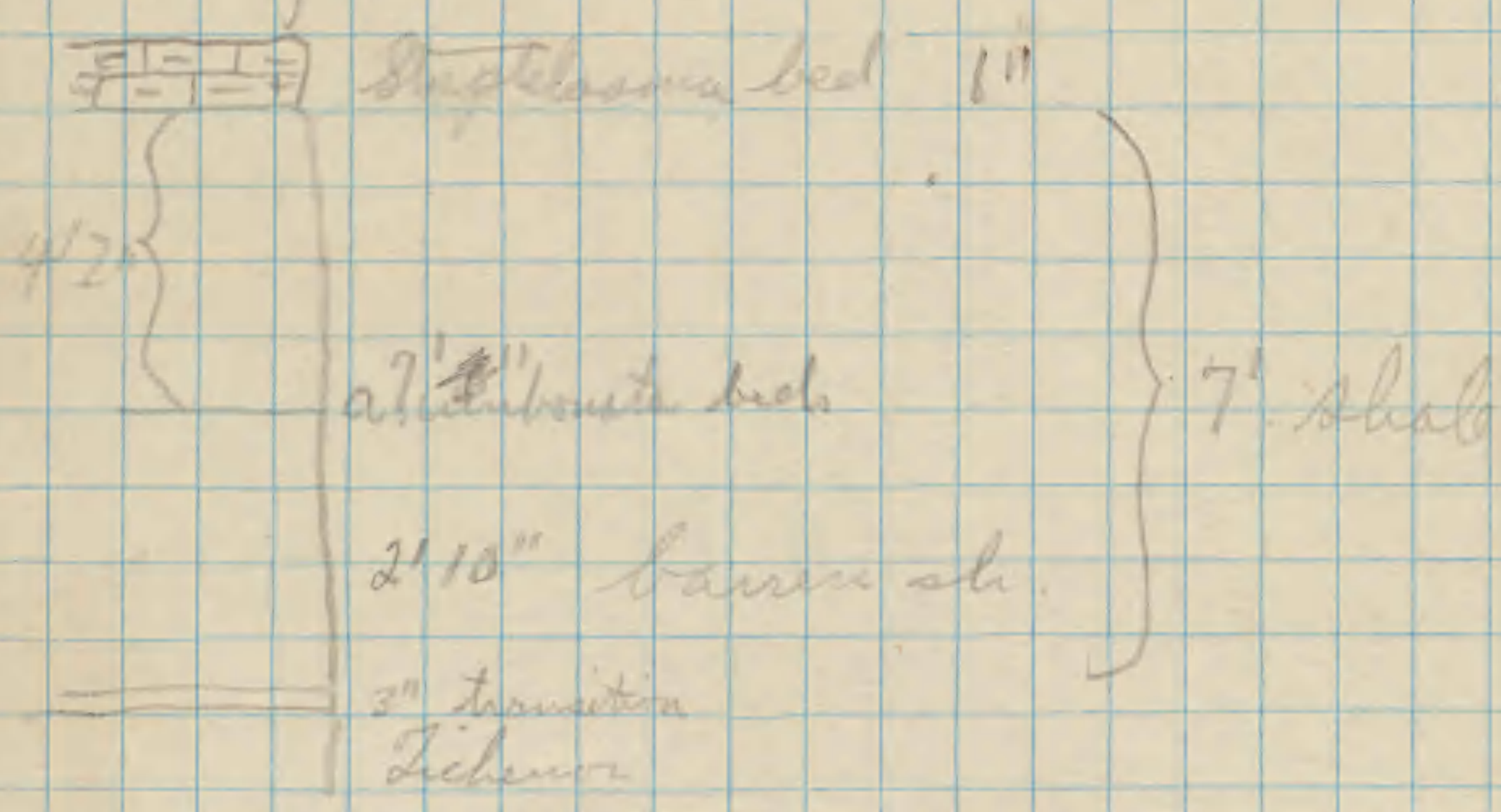
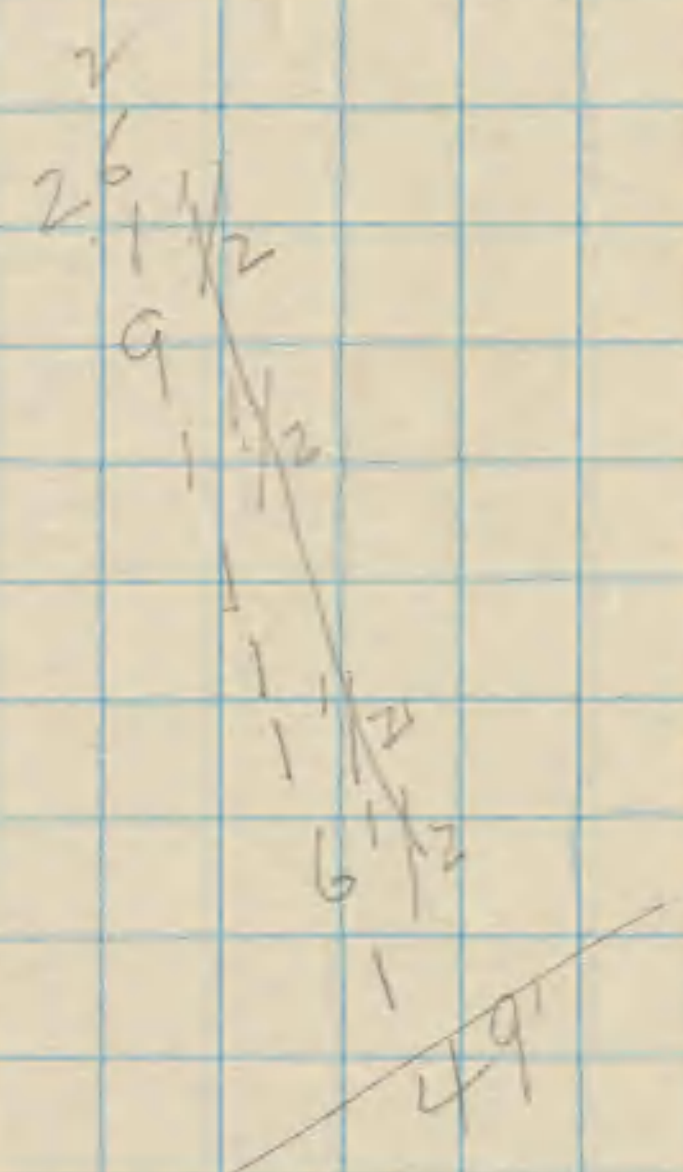
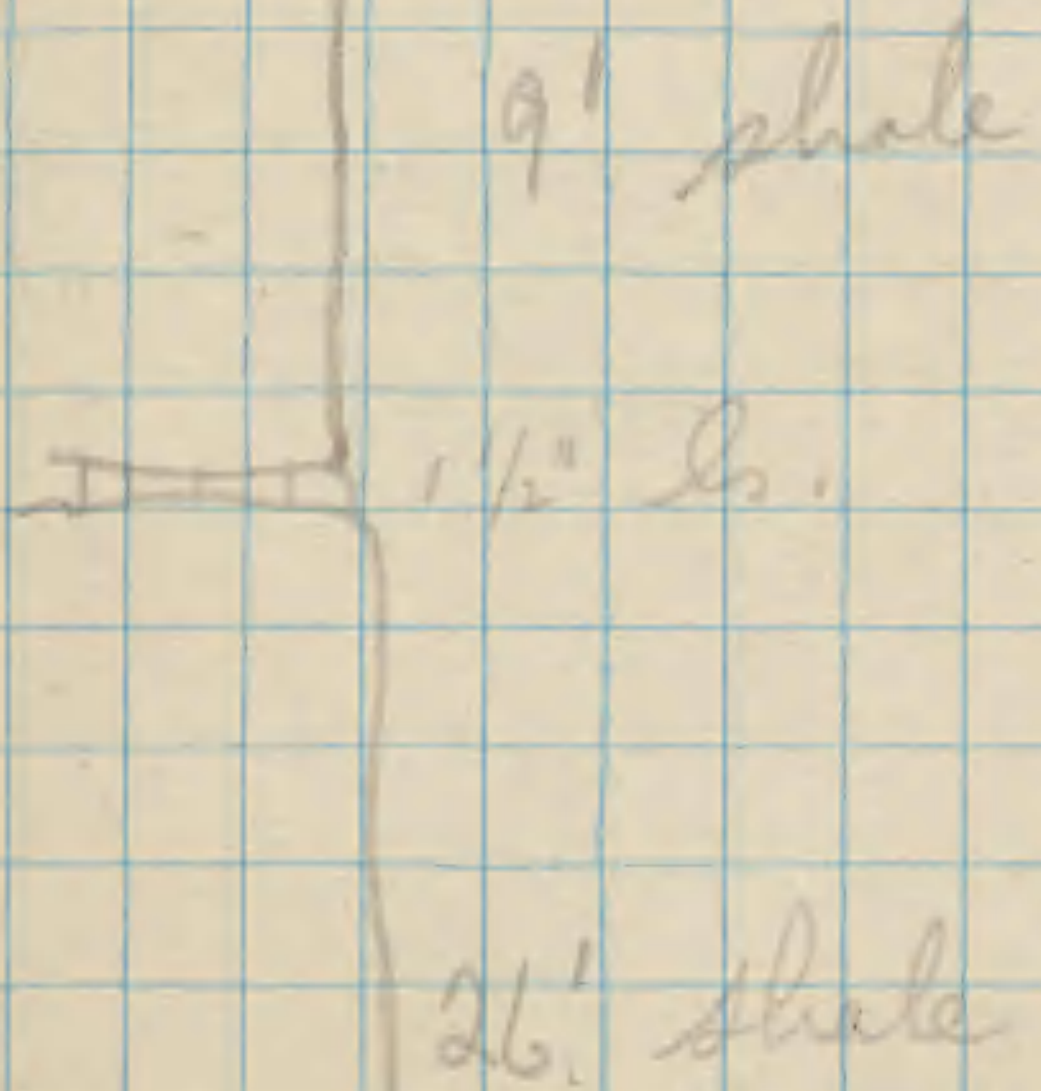
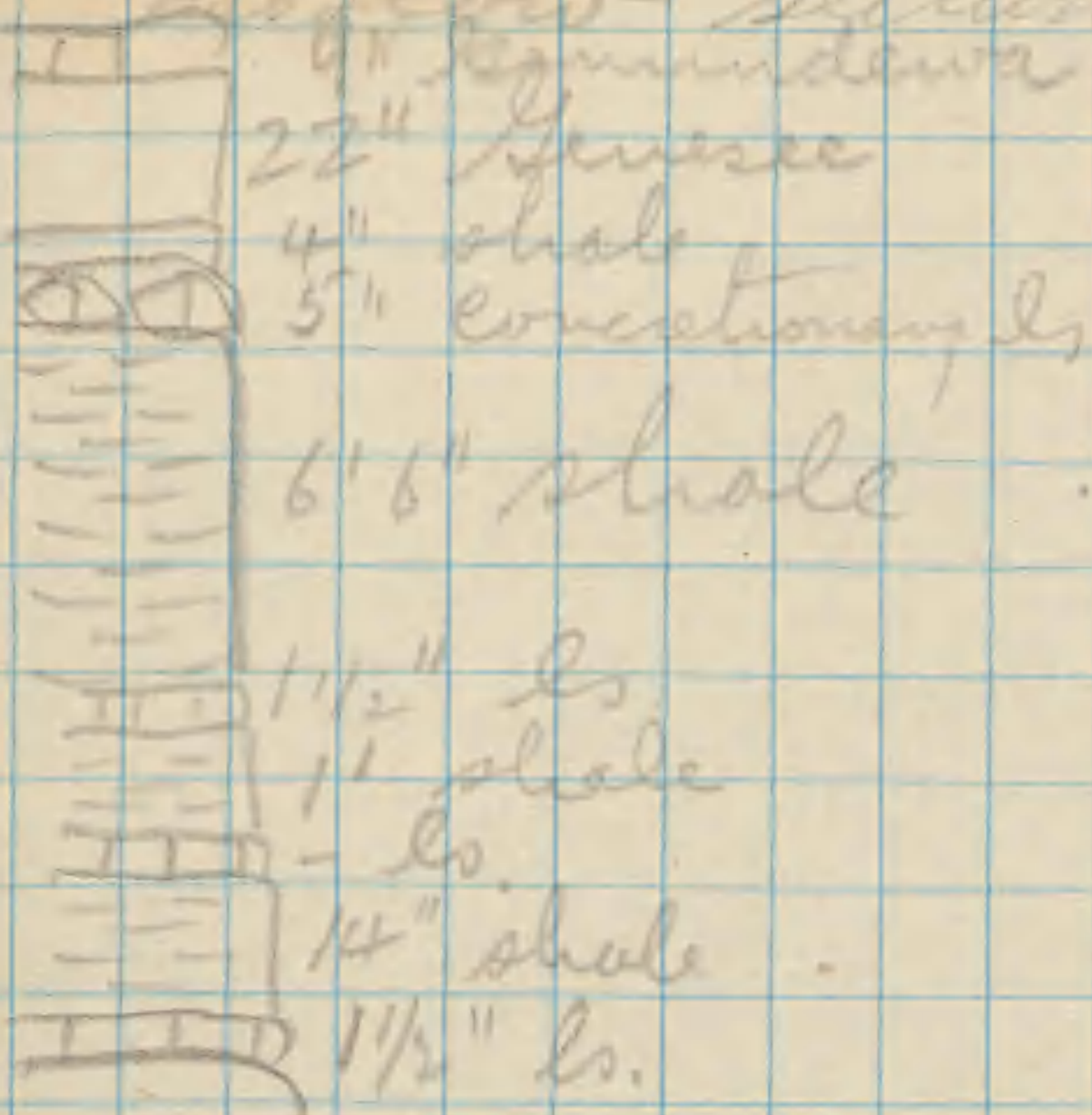
Between the Tichenor transition beds and the *Stroptelasma* bed are 7' of shale. The shale for 2' 10" above the Tichenor Transition contains very few fossils. It is essentially barren shale. Above 2' 10 inches *A. umbonata* becomes abundant. There is no visible difference in the kind of shale.

Fauna between 2' 10" up and the base of the *Stroptelasma* bed:—

A. umbonata a.*C. mucronatus* c.*A. andacula* c.*A. apiculatus**P. styloporum**D. consobrinus**A. spinosa**Ampelopsis* lance.*S. rectum*

Wagon section Paysonia Creek.

63
32
12187
73
650"



The *Streptelasma* bed is an impure
 brittle, shaly limestone fossils are rare
C. boothi *T. subelongata* *C. mucronata*
P. rana *A. umbonata* *S. rectum*
Sch. chemungensis
 It is not more than 4-8" thick and is exposed
 in the stream 345 paces above the bridge

1200 paces upstream thin ls. 35' above base is
 about 12' above stream level.

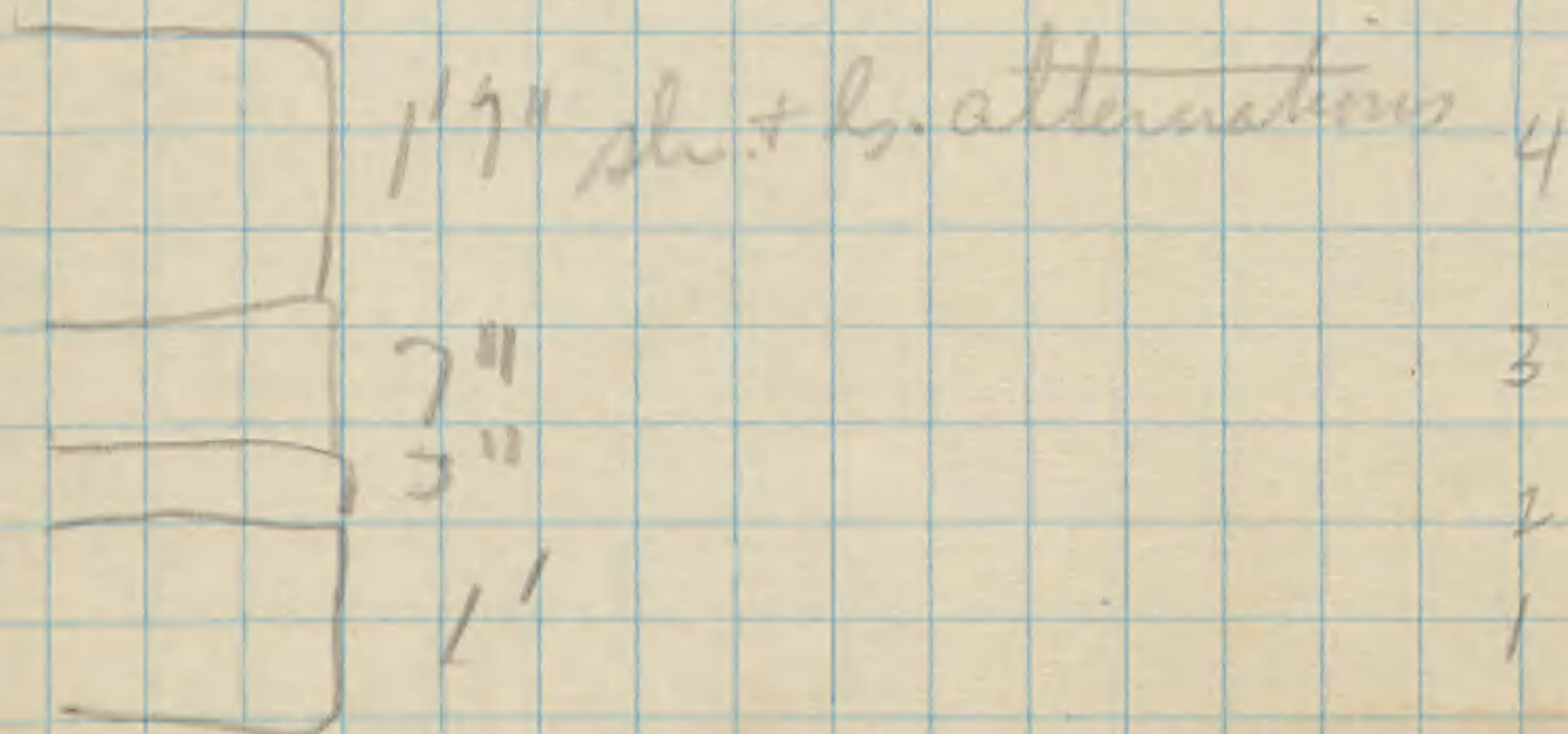
Fossils in concretionary layer below *Hemera*-
A. praecumbona *M. subulate* *M. oblongatus*
P. rana *A. reticularis* *A. spiniferoides*
 About 2700 paces from the bridge the concretionary
 bed is thick and abundant in *A. praecumbona*
 The shale between it and the pyrite is 15"
 thick and is fossiliferous:

A. praecumbona

A. andacula

At least 2 feet of rock contains *A. praecumbona*
 and for about one foot below the
 concretionary bed the shale abounds in
C. mucronata with a few *A. praecumbona*

Pickens section



1. is a heavy massive crinoidal ls. containing pebbles at its base and large numbers of fossils.

Fossils - *Angosia*, *F. carinatus*, *A. spiniferoides*, *F. placenta*, *R. vanuxemi*.

This layer would correlate with the one on the lake shore.

Fossils in *S. demissa* bed - Coz Ck.

S. demissa c

A. spiniferoides c

S. pappatus c

S. rectus

S. junia

A. macronota

The *S. demissa*

P. flabellum

R. vanuxemi

A. audacula

Cyrt. lamm.

F. carinatus

A. reticularis c

A. granulosa

bed is exposed from the bridge downstream for about 300 yds. Collecting is excellent. *S. demissa* is abundant.

Cazenovia Creek.

Essentially the same sequence as on Smokes Creek. *Staptelasma* bed has fewer fossils and is poorly defined. Collecting in the Moscow is not good. Damaged bed exposed at and downstream from Spring Brook bridge. Tichenor is thickened and is especially marked by the upper shaly layers.

Bullis bridge Tichenor is about 5' thick and shows an increase in layers at both top and bottom. *S. damosa* bed here exposed about 6' below Tichenor. Moscow section not good. Calcareous beds poorly defined. Shale between Tichenor and *Staptelasma* bed greatly thickened. Rushy shale not yet prominent.

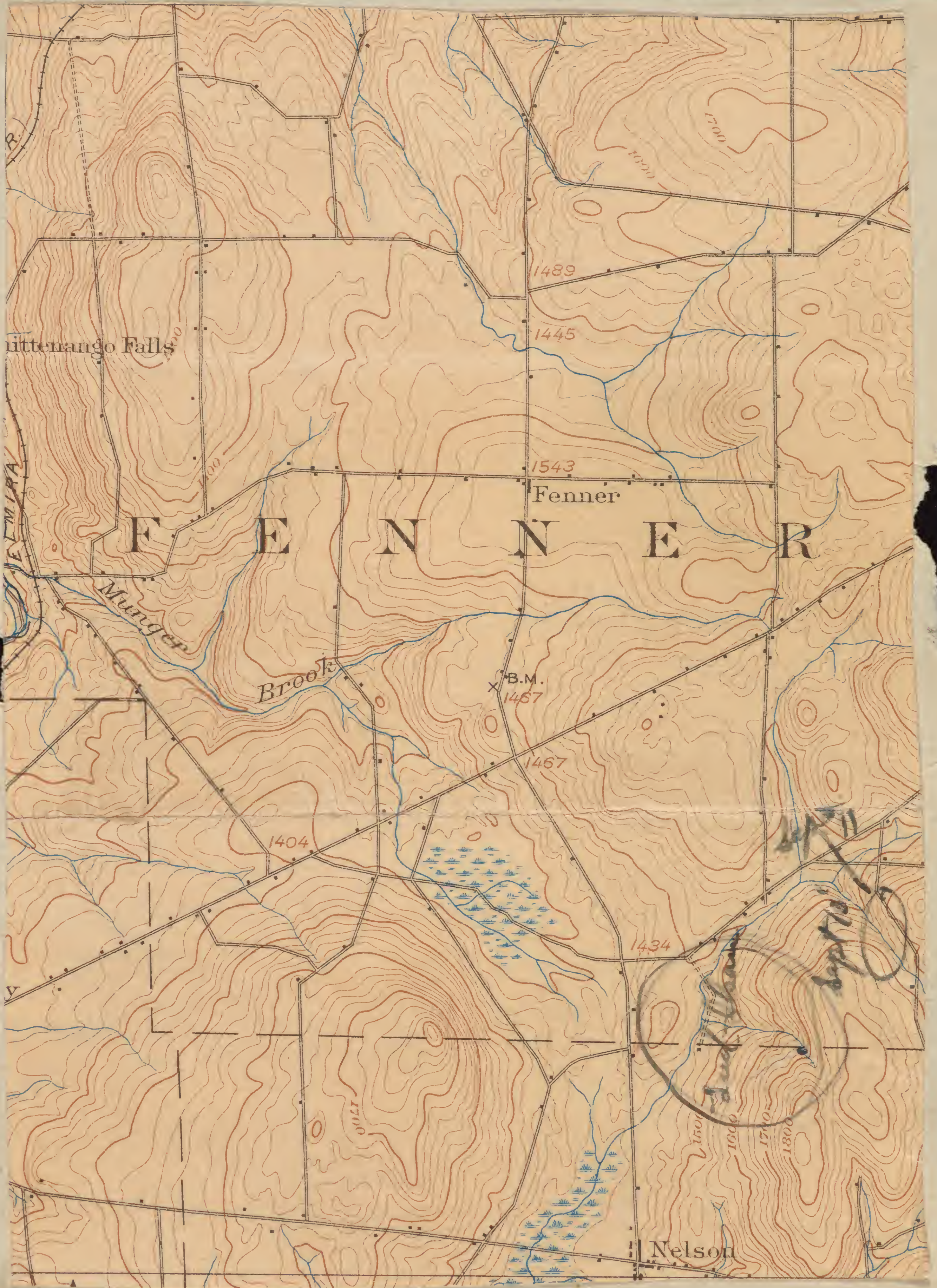
Cogenovia Creek

Fishion - 3' 4" thick in several layers.
 The lowest layer is about 5" of light gray
 ls. containing much marabout l. of
 l. P. corvallis, P. clausenata, & P. sp. in
 Platyceras. It is very irregular & has
 much shale. It is followed by
 12" of crinoidal ls. and this by 4" of
 the same material. The one foot left is
 probably the equivalent of the false
 shore of Horse Creek & it breaks into
 large blocks. The 12" bed is succeeded
 by one 2" thick & then by one 5" thick.
 These layers are very irregular & have
 some shale.

The different beds of the Fishion vary greatly
 in thickness. The lowest bed of the
 12" bed has much shale & hence have
 an irregular surface when weathered. The
 layers had a light gray color. Large coral
 heads abound in it. The second layer has
 D. subtilis but is only about 4" thick
 at the falls. Collecting is good, but it is
 almost impossible to keep the different layers
 straight. The increase in thickness has
 apparently come by additions of ls. beds
 above and below the Horse Creek.
 Crinoid stems of considerable length &
 thickness are common.

1928

160a



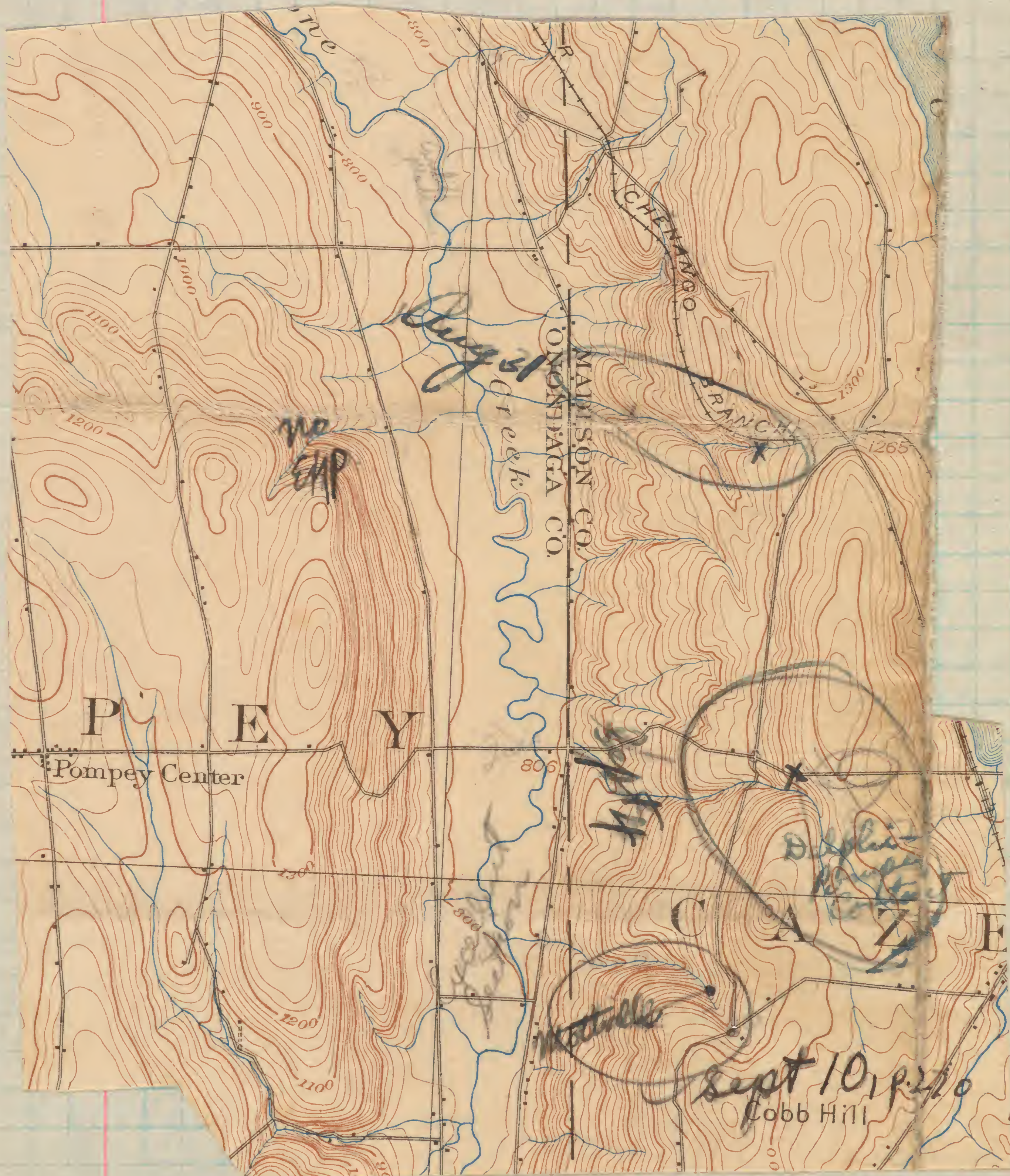
1928

160c



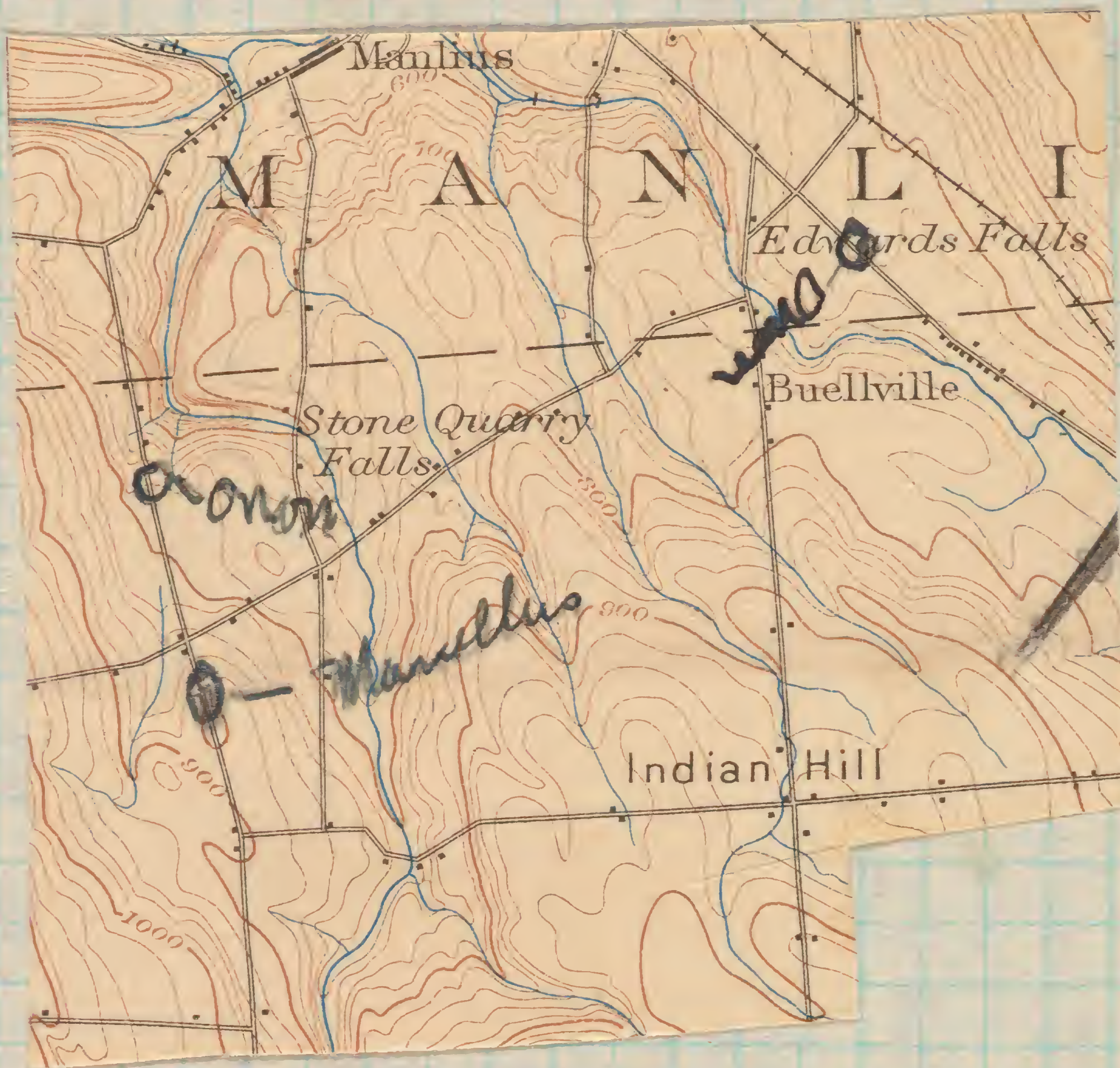
1928

160d



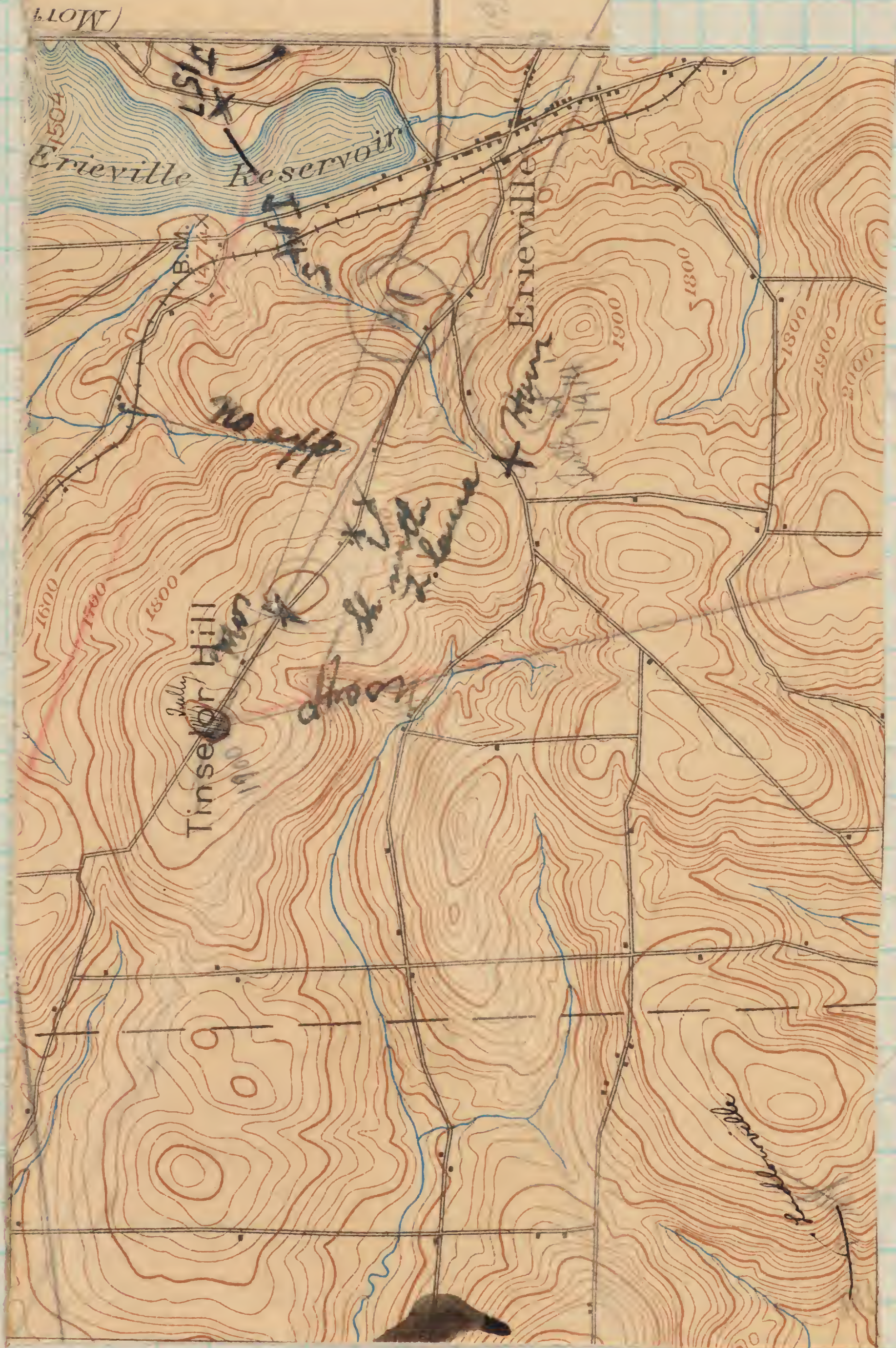
1928

160e

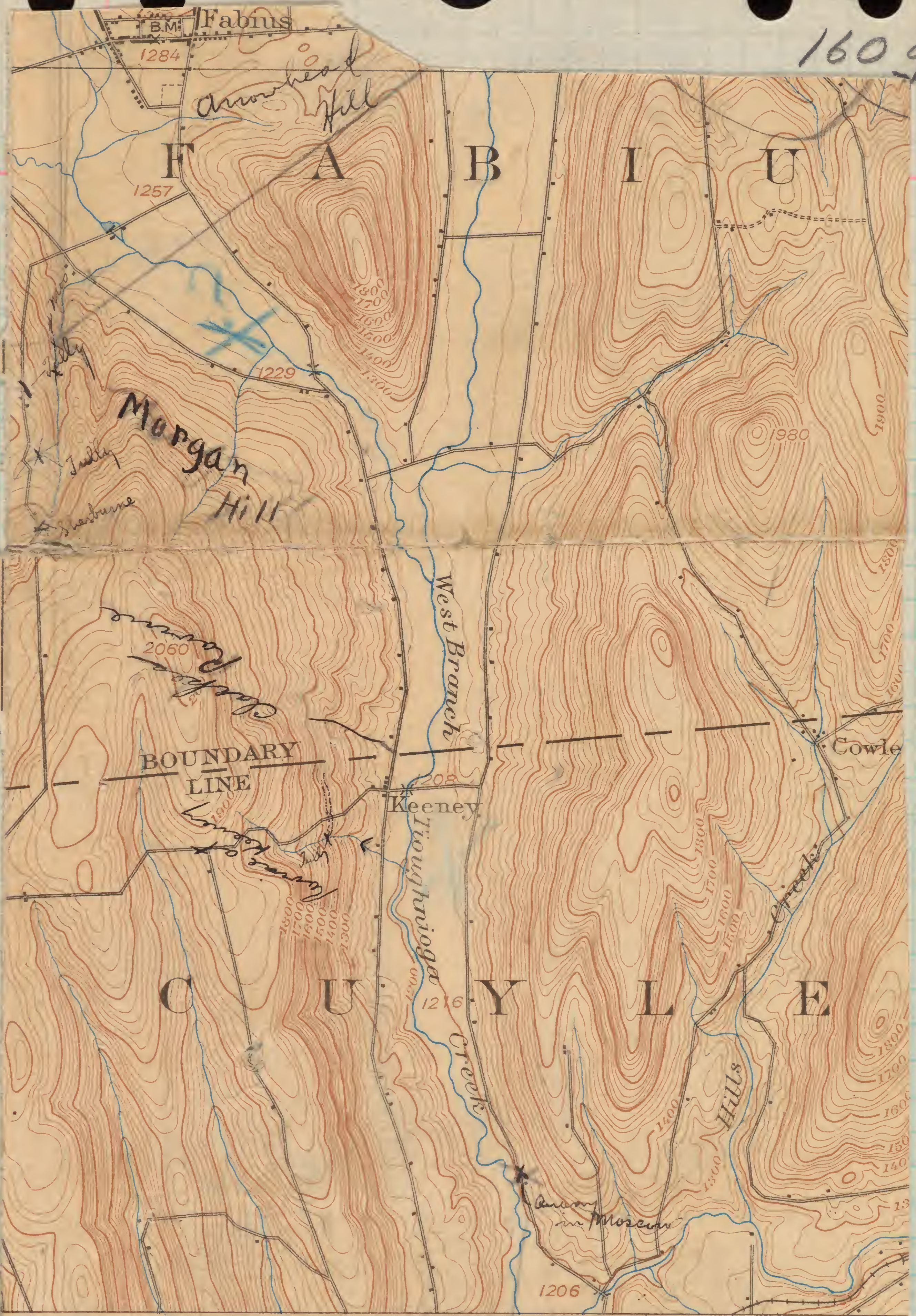


1928 160f

Sept 18



160.9



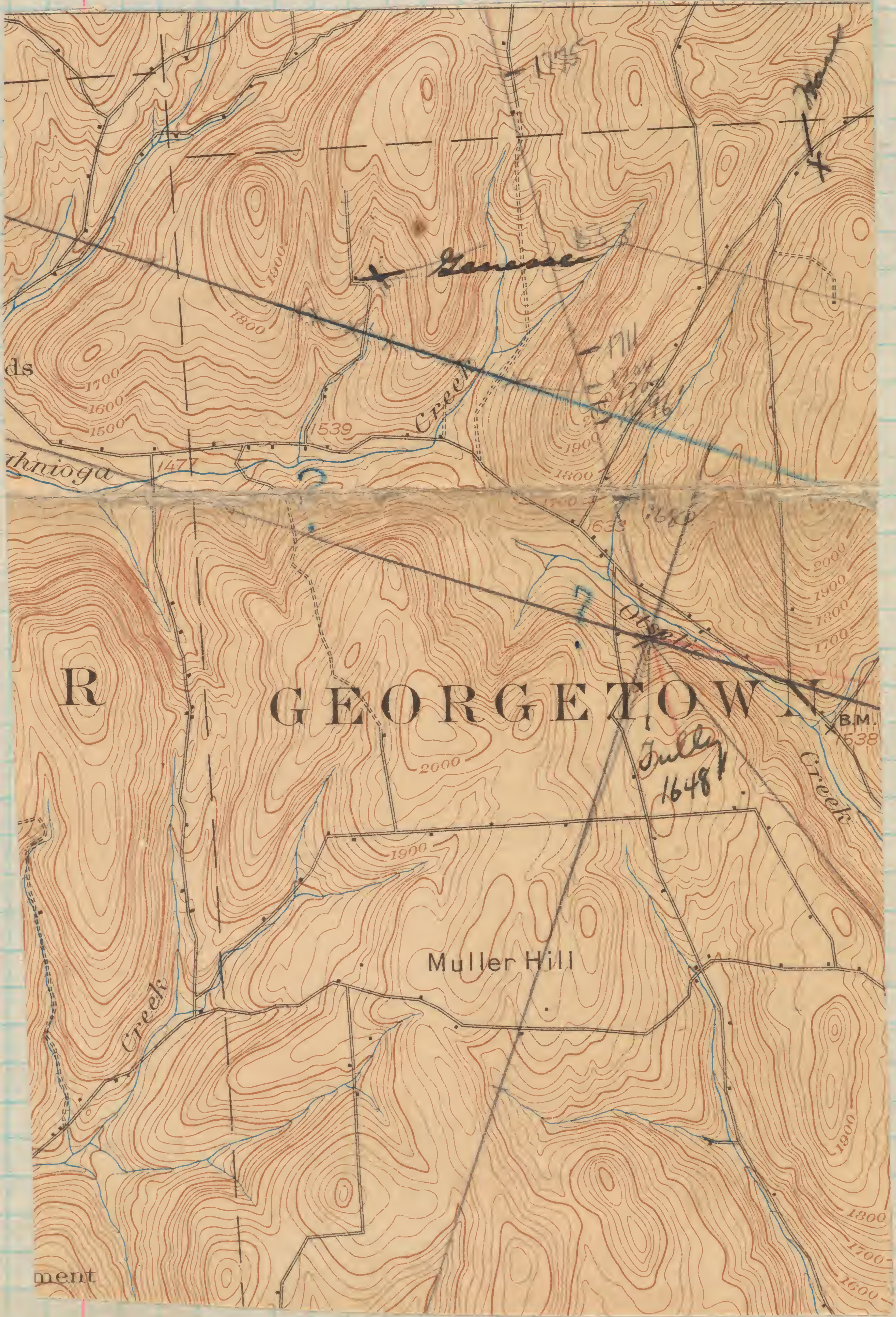
00'

ENGRAVED, OCT. 1899 BY U.S.G.S.

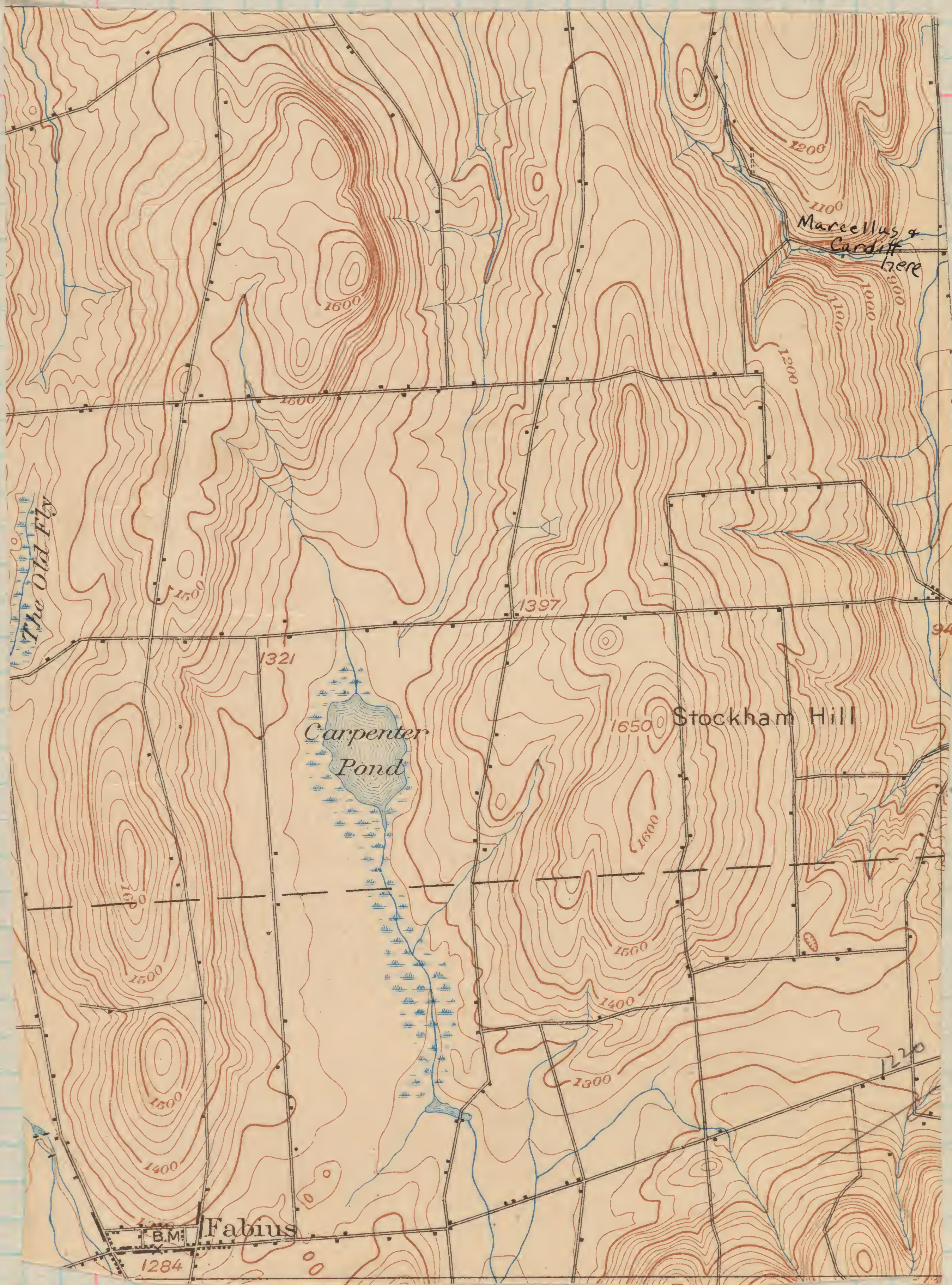
H.M. Wilson, Geographer in charge.
Control by N.Y. State Survey.
Topography by A.M. Walker.
Surveyed in 1897.



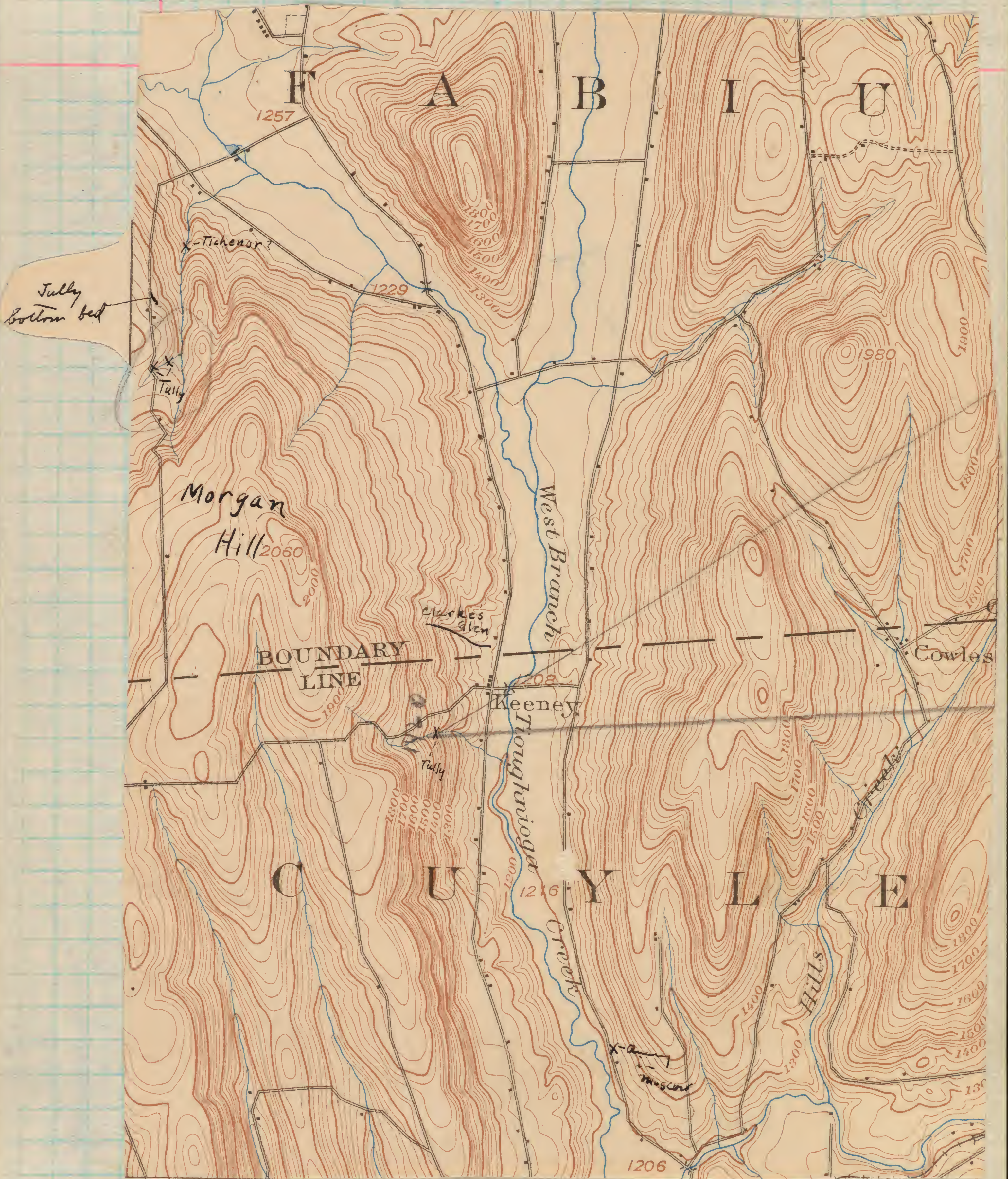
160h



160K



160L



1931

160m

PHY
YORK
THE
SURVEYOR



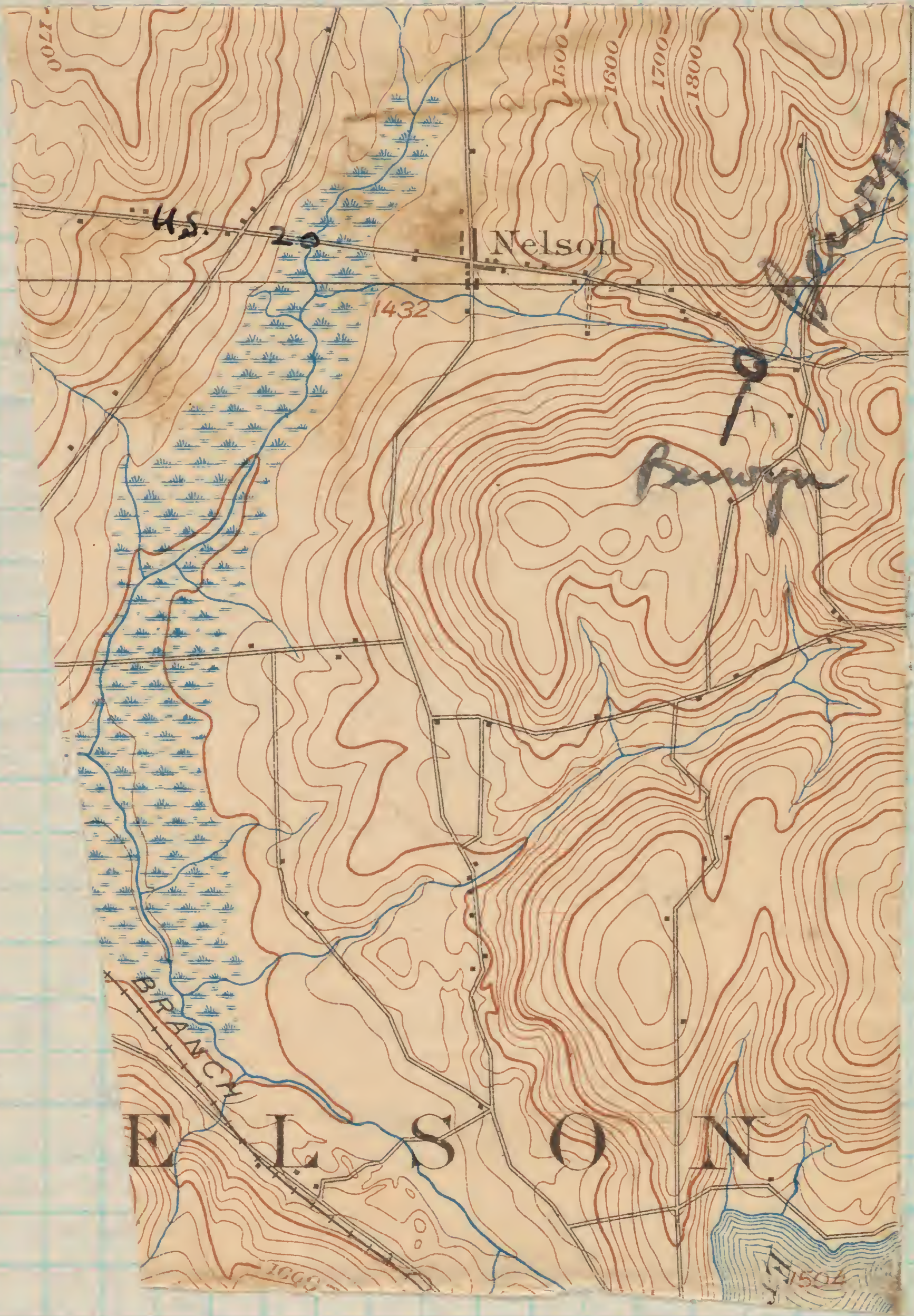
NEW YORK
CAZENOVIA QUADRANGLE

1931
160m

Delphi

1931

160 m

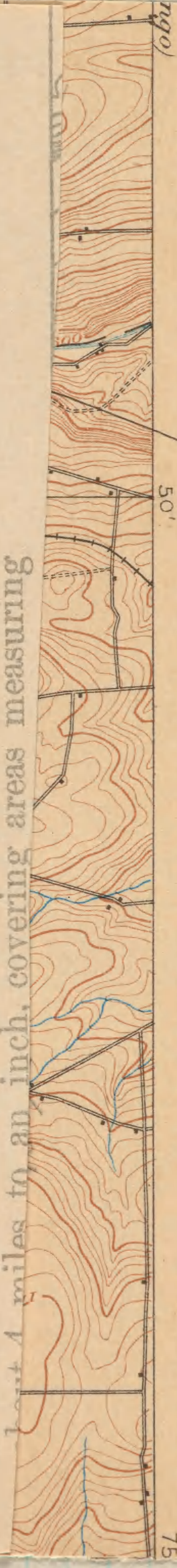


ed graphic scales showing distances in feet, meters, and
s. In addition, the scale of the map is shown by a repre-
ntative fraction expressing a fixed ratio between linear
measurements on the map and corresponding distances on the
ground. For example, the scale $\frac{1}{62,500}$ means that 1 unit on
a map (such as 1 inch, 1 foot, or 1 meter) represents 62,500
linear units on the earth's surface.

he standard scales used on these maps are multiples of
fraction $\frac{1}{1,000,000}$. Quadrangles in thickly settled or indus-
trially important regions are mapped on a scale of $\frac{1}{62,500}$, or
at 1 mile to an inch, and cover areas measuring 15' in
latitude and longitude. Quadrangles in less thickly settled or
industrially less important districts are mapped on a scale
of $\frac{1}{125,000}$, or about 2 miles to an inch, and cover areas measur-
ing 30' in latitude and longitude. Reconnaissance maps of
sparsely inhabited regions have been made on a scale
of about 4 miles to an inch, covering areas measuring

valleys, as well as their altitudes
are far apart on the map indi-
cated close together indicate a steep
slope together indicate a cliff.

The manner in which contour
lines and grade is shown in the figure



NEW YORK
CAZENOVIA QUADRANGLE

APR 1900
NEW YORK
D BY THE
AND SURVEYOR

Manuello - Agostini

1520
1990
535
190
230
490

1600

1000

APHY

NEW YORK
D BY THE
AND SURVEYOR

ngo)

*Manellus - Aggricatis
Cardiff*

NEW YORK
CAZENOVIA QUADRANGLE

75



...cessive contour lines that
te a gentle slope; lines that are
slope; and lines that run to-
ur lines express altitude, form,
e below.



HO ELEVATION
900101

exact altitudes—those of bench marks—as well as the geodetic coordinates of triangulation stations, are published in bulletins that are issued free by the Geological Survey.

The lettering and works of man are shown in black. Railroads, such as those of a State, county, city, land grant township, or reservation, are shown by continuous or broken lines of different kinds and weights. Metaled roads are shown by double lines, one of which is accentuated. Other public roads are shown by fine double lines, private and poor roads by dashed double lines, trails by dashed single lines.

Each quadrangle is designated by the name of the principal city, town, or natural feature within it, and on the margin of the map are printed the names of adjoining quadrangles, which maps have been published. Over 2,800 quadrangles in the United States have been surveyed, and maps of similar size to the one on the other side of this sheet have been published.

The topographic map is the base on which the geologic map is drawn. The mineral resources of a quadrangle are represented, and maps showing these features are bound together with a descriptive text to form a folio of the Geologic Atlas of the United States.

Index maps of each State showing the topographic map

160P

160P

DEPARTMENT OF THE INTERIOR
ALBERT B. FALL, SECRETARY
U.S. GEOLOGICAL SURVEY
GEORGE OTIS SMITH, DIRECTOR

*This road
upper Marcellus - Cardiff
Shenandoah.*

TOPOG

STATE OF
REPRESENTATIVE
STATE ENGINEER
(Chitt



ed by figures showing altitude. Such as road corners, summits, marks—are also given on the map to the nearest foot only. More marks—as well as the geodetic stations, are published in bulletins.

Boundaries are shown in black. Boundaries, county, city, land grant, townships are shown by continuous or broken lines. Good motor or public roads by dashed single lines. Poor motor or private roads by dashed single lines.

Boundaries are shown by the name of a city, town, or village within it, and on the margins of the names of adjoining quadrangles of the map. Over 3,300 quadrangles in the United States have been surveyed, and maps of them are published on the other side of this sheet have been

the base on which the geology and topography are represented, and the maps are bound together with a descriptive Geologic Atlas of the United States have been published.

Maps of Alaska and Hawaii showing topographic maps and geologic folios published by the Geological Survey may be obtained. Topographic maps may be obtained. All maps are sold at different prices.

thrown from the northwest across the purpose of giving the appearance of the interpretation of the contour lines. A contour line represents an imaginary line on the map of which is at the same altitude. Contour lines could be drawn at any altitude. Contour lines are drawn at certain regular intervals. The line of the seacoast itself is a contour line of mean sea level. The shape of the shore line if the sea should rise to the shape of the hills, mountain, or valley. Successive contour lines on a map indicate a gentle slope; lines close together indicate a steep slope; and lines that are widely spaced indicate a gentle slope.

The manner in which contour lines and grade is shown in the figure.



1608

us
Hy 20

058



161
Ravine $\frac{1}{2}$ mi. n - Chatterango Falls

Chatterango Falls.

Bot top of Agoniatites at ~~981'~~ ^{981'} A.T.

Top of Onondaga in ravine occurs at about ~~980'~~ ^{960'} A.T. ^{Band at 970' A.T.} Just feet below, road at the bend. It was not examined 20' 20' above this ls. occurs the bottom of the Agoniatites. Below the Agoniatites, about 1' of the black shales are seen. These have *P. fragilis* and *S. fissurella*. The layer is 3' thick. The bottom layer has many small trilobite remains, the upper layer is crowded with snails, *Buchida* and other small fossils. The rock in the lower part dark crumbly ls. The upper 6" has the snails!

Above the first 15' above the Agoniatites, large septaria were seen, in one corner the shale layers were puffed around the concretions. The septaria 12' above seem to be in a layer.

21' 10" above the Agoniatites were seen 3' of shales which in the stream bed are rather compact and brittle when broken but in the stream bank they fall to small chips which are very often considerably rusted.

At 108' above the Agoniatites band were seen on the west of the R.R. tracks a small exposure of black fissile shales which have the peculiar pitted surface characteristic of the *Wabellus*. On the east bank were seen similar shales which have produced a talus slope. This slope is composed of chips of dark and light shales.



Section showing shale
unappressed about 11' above
Agoniatites

the light shale must be from near the top and this is about 15' above the R.R. tracks at an elevation of about 1080' A.T. By hand-level it was 20 steps up to the R.R. tracks & 2 more to about where the Cardiff comes in. The Cardiff, by my level must come in about 23 hand-level steps above the Agoniatites. And this would give a thickness of 145' to the Marshallus.

At the culvert 4 steps were reached and the culvert rises one step so on the opposite side hand-leveling was again begun at the 5th step above the Agoniatites. On the east side of the culvert black shales were seen again in their step-like weathering forms. 49' above Agoniatites and only a short distance from the R.R. (20') was seen a large concretion perfectly round in outline but depressed above so that it would produce an oval cross-section. It was about 3' in diameter. A small fragment of wood was seen here. The shale here gives a brown streak.

At the bottom of the 15th step there is another large concretion.

At 16 steps above the Agoniatites the stream forks and the contact cannot be far from here. The rock gives a somewhat lighter streak but is just as fissile and sect. like that below.

The rock is also very faintly gritty. At 18 steps is a large flattened concretion $3\frac{1}{2}$ in diameter. The shales are like those at 16. The shale in the slope here gives a faint brown grey streak & appears dark bluish black rather than black.

(At 20' steps is another large concretion 2' in diameter. The shales here are still fissile and quite black.

21 - streak lighter, fissile, the shales above 21 seem bluish but I can't be sure.

22 - the shales are somewhat more massive, slightly gritty and on the surface have a blue appearance. They also come out in curved layers. They break into thick chips. I believe that here is where the line comes at ~~1103~~ 1105' concretions were seen between 22 + 23 - about 2' up.

Streak at 25-26 - without any very noticeable brown.

The shale pieces on the slope in a small ravine at 31 weather to a light tan or olive color.

The last rock seen was at 36 steps. All of the Cardiff shales seen here and are all unfossiliferous and the kind that weather to an olive color.

$$\begin{array}{r} 22 \\ 5 \\ \hline 119 \\ \hline 119'' \end{array}$$

$$\begin{array}{r} 994 \\ 119 \\ \hline 1113 \end{array}$$

Aug 30.

Road between Orono & Cagaucoia

Aug 30' An outcrop of Muschelium about 9' vertical at bend of road about $1\frac{1}{4}$ miles southeast of Orono. Here the shales are fresh, black, fissile, nowhere exposed for some time, but in places completely bed with a subconchoidal fracture. Streak - brownish-grey. Some of the fissile shale chips show a pitted surface like those on Orinda Creek. The jointing is very irregular and no definite sets are defined. In places the joint surfaces are curved, in others irregularly undulating.

Two huge concretions are exposed here about 2' from the base of the small quarry. One is nearly circular, but flattened down above and has a diameter of 41 inches. The ls. is a very dark grey, with conchoidal fracture, very even, fine texture, yields knife edges on fracture. Because of conchoidal breakage. The streak is also brownish. The other concretion, as also the first described approaches a spherulitic structure. As along some of the seams, calcite has been deposited.

No fossils were observed either in the shales or in the concretion. Elevation of this exposure is about 390' A.T.

Along the highway and up the hill from the bridge structure 12 and 13 steps the shale has a decided bluish tinge over the surfaces of chips which are very dark green on the interior. Furthermore the breaks into rather sticky fragments and are very often also stained reddish brown.

18 steps above the bridge at the

Turner is a large exposure about 12' vertical showing shales that break into small stocky chips or sometimes into small spheroidal or oval fragments. The shales are greatly stained by iron so that they are red brown. In cross-section they are very dark grey and are slightly gritty to the touch. Some of the fragments are shiny brown having a coating resembling "dust varnish". The cross-section of these weathered fragments is not the typical olive color of the Cardiff and it is that that they belong to the Marcellus.

300 paces intervene between the last of these and the acute road intersection near the bridge.

Between 72 + 13 ~~paces~~ steps above the bridge the Marcellus seems to lose its friability but I found no fossils and would therefore not place the Cardiff line of level. I believe the Cardiff comes in at the bend in the road near the top of the hill. A huge concretion was seen in the gutter about 20' above the bridge.

About 10' above the 18th step some olive shale was noted in a thin band but this gave way again to the blue grey shales.

$$\begin{array}{r} 18 \\ 13 \\ \hline 5 \end{array}$$

30

$$\begin{array}{r} 65 \\ 860 \\ \hline 925 \end{array}$$

$$\begin{array}{r} 65 \\ 860 \\ \hline 925 \end{array}$$

at the elevation of about ~~1275~~ ¹²⁷⁵ occur coarse shales that are sandy and hard. This band can be seen for about 3' below 1275 in the side of the road. It is in the gully at 1275'. This rock contains large fossils as:-

Nephriticeras sp.	A. deussati
P. discoidium	T. carinatus
D. arenata	P. lirata
H. dehayi	C. scitulus
✓ C. setigerus	A. erectum
✓ C. mucronatus	P. flabellum
✓ P. spinulicosta	P. rana

Schuchertella
Cyst. ham.
P. rana

Rock exposed below 1275 for about 2' is softer, but somewhat arenaceous and has L. laevis, S. pinnatus, H. triguster.

Some of the layers of this band at 1275 are quite calcareous and they contain:-

Schuchertella	P. flabellum
C. coronatus	C. scitulus
Cyst. ham.	P. rana
S. angulatus	C. boothi
M. pygmaea	S. crotallum
C. mucronatus	Cranella ham.
C. setigerus	Lox. hamiltoniae

1275-1280 - the shale just on the hard band which is about 4 feet or two thick, is softer and contrasts strongly with the rock below. It has in the first 20 or 30:-

C. boothi	Cystospora
P. spinulicosta	P. lilla
Ostracoda	C. mucronatus

Fossils in shale to top of hill.

Shales at the bottom of the hill are rather soft, & gritty & have

L. laura	S. truncata
N. triqueter	Erismyia sp.
P. flabellum	P. rana
P. constricta	M. mytiloides
L. cristatum	Cyrtotites
S. arctostriatus	A. decussata
	P. spinulicosta

Next to shales common larger shales

P. lirata	A. boydi
Tarum	P. disoidemum
P. constricta	S. munitum
Schuchertella sp.	A. pinnata
Panemba sp.	A. scabildes
	H. arcuata

Aug 31

Shales along roadside leading up to just north of the tunnel. Outcrops of sand near just south of the little vale just below the hill. The lower shales are rather soft, grey, gritty shales with the following fossils:

Cystigera	Cyrtotites sp.
M. subulata	N. oblongatus
Schuchertella antonietti	P. pinnata
Pal. concentrica	M. subulata
A. boydi	L. laura
P. spinulicosta	C. constricta
Pal. tenuistriata	N. angusta
C. boydi	S. cristatum
J. submarginata	N. triqueter
N. corbuliformis	P. flabellum
H. acris	C. marginatus
M. variegata	M. mytiloides

C. coronatus
Conularia sp.
S. andaculus ?
Orthis sp.
O. princeps
C. coronatus
M. angusta
A. boydi

P. flabellum
P. rana
Crinoid stems
M. concentrica
P. lirata
Nautiloides
Par. Hamiltonia

Some of this rock is hard and calcareous too & probably belongs below.

Fossils between 1275' - 1285' 10" —

The shales are rather soft, dark grey, gritty like those at Parkport: —

See lists on second preceding page

Fossils 1285' 10" - 1291' 3" —

<i>A. boydi</i> var.	<i>P. spiriferoides</i> c
<i>C. micromatus</i>	<i>C. bitulus</i>
<i>Pal. concentrica</i>	<i>L. arctostriatus</i> var.
<i>P. maxima</i>	<i>P. rana</i> var.
<i>P. flabellum</i>	<i>M. coracina</i>
<i>T. submarginata</i>	<i>L. cristatus</i>
<i>Orthis</i> sp.	<i>S. perplanus</i>
<i>M. coracina</i>	

At about 1288' the shales become heavier and break into large ^{irregular} blocks and not into small blocky fragments.

Fossils in the coarse rock
between 1288 + 1291 are:-

<i>P. lirata</i> n	<i>T. submarginata</i> n
<i>P. flabellum</i> n	<i>L. laevis</i> sp. n
<i>N. arguta</i> n	<i>A. boydi</i> c
<i>I. granulosa</i>	<i>U. oblongatus</i> n
<i>S. crotalum</i> n	<i>S. periplana</i> n
<i>O. thomasi</i> sp. n	<i>S. arctostriatus</i> n
<i>M. triquetra</i> large	<i>M. subolata</i> n
<i>P. subpina</i> n	<i>C. boothi</i> n
<i>H. bisulcata</i> n	<i>C. congregata</i> (loose)
<i>A. fasciculatus</i>	<i>S. robusta</i> n
<i>P. hana</i>	<i>A. princeps</i> n

1291'3" - 1296'8" -

<i>M. mytiloides</i>	<i>S. chrysomela</i>
<i>A. princeps</i>	<i>Conostrophia</i> sp.
<i>P. lirata</i>	<i>S. arctostriatus</i>
<i>H. arcuata</i>	<i>A. boydi</i>
<i>U. oblongatus</i>	<i>C. boothi</i>
<i>S. crotalum</i>	<i>C. vicinus</i>
<i>S. fasciculatus</i>	<i>U. arguta</i>
<i>A. depressa</i>	<i>P. flabellum</i> c
<i>P. emarginata</i>	<i>A. reticulata</i> n
<i>Conostrophia crucifera</i> n	<i>C. elongata</i>
<i>P. hana</i> n	<i>Pal. tenuistriata</i>
<i>G. spiriferoides</i> c	<i>H. oblonga</i> n
<i>B. submarginata</i> n	<i>Cyrtolites</i> n
<i>P. patulus</i> n	<i>P. diacoides</i> n
<i>M. concentrica</i> n	<i>A. fasciculatus</i>
<i>S. granulosa</i>	

1296'8" - 1302'1" - the shales here had
into somewhat smaller pieces than
those below:-

<i>H. arcuata</i>	<i>N. arguta</i> cc
<i>A. princeps</i>	<i>P. flabellum</i>
<i>Pal. concentrica</i>	<i>S. crotalum</i>
<i>A. fasciculatus</i>	<i>P. spinulicosta</i> c
<i>P. lirata</i>	<i>L. laevis</i> c
<i>S. granulosa</i>	<i>M. macrostoma</i>

On a single slab here the following were found in association:
N. arguta, *L. laura*, *P. spinulicosta*,
P. flabellum, *A. reticularis*, *S. angulatus*,
Cyrtolites sp., *Spirifer*

M. subglata
Par. harringtoni
C. boothi
M. mytiloides

Leptotaria sp.
Pal. concentrica
A. bogdi or

1302-1307' 6"

Spirifer sp.
P. flabellum c
L. laura c
N. arguta cc
P. spinulicosta
Cyrtolites sp.
Macrocheilus
A. acuticostus
P. discoidium

A. spiniferoides
S. subglata
A. fasciculatus
H. dekeyri
Orthoceras sp.
A. bogdi
A. reticularis
M. concentrica
H. ashi

1307-1312' 11"

P. flabellum cc
A. reticularis c
N. arguta cc
A. spiniferoides
L. laura
A. fasciculatus
S. truncata
A. princeps

P. discoidium
Pal. concentrica
Sphenotus
L. macroptera
A. bogdi c
A. acuticostus
Macrocheilus hum.
M. concentrica

1312' 11" - 1318' 4" The shales in this interval are very hard and appear to be sandstones. They have:

M. concentrica
A. bogdi
Savignyi
L. spinulicosta?
P. discoidium

L. croatica
S. erigone
S. carinata
N. arguta
P. flabellum

A. princeps
A. fasciculatus
S. truncata
L. laura (1st on plate)
A. princeps

Schuchertella (large)
Pachymetopinae
S. crotalum c.
R. grandis ?

1318' 4" — 1323' 9" —

T. carinatus c.
M. mytiloides c.
T. argus *
S. crotalum
Cystodictya sp.
S. granulosa
S. purpurina
P. angusta
N. arguta c.
C. recurva

P. flabellum
A. princeps
R. boydi c.
C. elongata
L. n. crotalum
Camantechia sp.
C. corrugata
S. channingensis
A. spiriferoides
C. mucronatus

At about 1322' *C. carinatus* comes in and here the coarse rock is slightly calcareous. It is very hard and resistant to the hammer.

About the last 8' of rock is very hard and resistant to the hammer and is also very difficult to collect. Fossils in the hard rock from 1323' 9" — 1329' 2" are:

Sphenotus sp.
M. mytiloides c.
S. alveolata (1st appearance)
T. carinatus
S. crotalum
A. spiriferoides
M. concentrica
T. recurva
P. flabellum
A. decussata
P. lirata
N. arguta

A. princeps re
S. purpurina
S. granulosa
R. boydi c.
P. spiriferoides
S. dendrochus
Cystodictya
C. mucronatus c.
S. arctostictus
S. angulatus
C. boettii
M. concentrica

This layer is about 4' thick
here and is composed of hard
compact sandy shale breaking
into thick irregular slabs.
Macrochilus subquadratus.

Over this hard band the shale
is more like those below but
much more fossiliferous.

Pecten

Athyrid

Spirifer

P. subquadratus

P. subquadratus

This hard band is exposed 125
paces from the road intersection
at the foot of the hill and it
occupies 2 ft paces. It is exposed at
about 1272'

1265

27'

August 30³

Along the Bigway on the east side of the roadway in the valley there 27' above the stream in the hollow shales are revealed which break easily into chunky fragments. They are almost olive green or green in color and weather on the surface to a brown with a slight varnish appearance. They have the following fossils and are probably Skaneateles in!

S. scitulus n.*Ostracoda**S. penetrans* n.*A. subcostata**H. oblongatus**Chaga spinifer* n.*C. subcostata* n.*P. spinulosa* n.*Orthoceras* sp.*S. andalus*

The shale in the gutter which is fresh has the exact appearance of that in the Bear Mtn. ravine, the blue grey. Between the 8th + 9th steps above stream *X* large *Spinifers* in an excellent state of preservation are common.

*P. costata**S. planum*

At just below 8 steps a local hard layer has *S. perplanum* cc.

There are some small concretions in these layers bearing the large *Spinifers*. These layers probably correlate with the hard band in the Bear Mtn. ravine.

The large *Spinifers* go up to about 60' above the stream.

Between 10 + 14 steps there is a hiatus but at 14 comes shale, blue thin below with:-

<i>S. arctostriatus</i>	<i>A. umbonata</i>
<i>P. spinulicosta</i>	<i>C. musonatus</i>

These shales are rather arenaceous.

Fossils between 14 + ¹⁷~~16~~:-

<i>Loph. ham. cc</i>	<i>P. liata</i>
<i>Schuchertella</i>	<i>S. pennatus</i>
<i>A. umbonata c</i>	<i>Strombus</i>
<i>C. setigerus</i>	Circular stems
<i>P. lineolata</i> ?	Large Spirifer
{coarse ribbed very large}	

The shales have a concretionary structure at 17 steps.

17-22 steps, hiatus
 Range 22-24 - none found
Spirifer sp.

From 22-25 steps brown weathered shales line the east side of the road. I found no fossils in this upper portion, not because they do not exist there but because the exposures was not favorable for collecting.

Aug 30th

Cardiff? shale along railroad:-
In the cut there are about 30' of
shale exposed that weather into
very small fragments or larger
irregular pieces. The small fragments
are but paper thin but are rather
thick, small and very irregular
but flat. The whole is rather gritty
when crunched. When fresh it is
dark grey, but on the surface may
weather to an olive or lead brown
color. Large slabs when hit by the
hammer shatter into small irregular
fragments.

Concretions are very abundant but
all of them are well small and
occur in a variety of shapes. Occasion-
ally fossils are included in them.

Fossils are not abundant and
appear at this locality to be scattered
throughout the mass. *Leiorhynchus* is
most common.

*L. laevis**Leiorhynchus linitaris*?*C. levillus**L. alba**P. discoides**N. oblongatus**Orthoceras* (several sp.)*P. apiculata**A. umbonata*?*S. pinnatus**S. pinnatus**N. trinquetti**P. fragilis*

Sept 1.

Pratt Falls 1927

At 0 paces an exposure of bluish grey shales, rather gritty and contain *P. spinulicosta*, *P. pennatus* and many *A. umbonata* & a few *Hamiltonella*. 8' vertical

At 114 paces was seen a small exposure of rather hard sandy shales with *P. spinulicosta*

At 130 paces is a layer of hard calcareous rock with many *C. macronotus* and some *spidifera*. 5' above this appear sandy shales. This calcareous rock may be a very large concretion

At 160 paces in the bed of the stream the rock is a rather soft gritty shale with *Productolites* sp., *spidifera* sp., *Platystrophia* sp., *Trinacromorphus* sp., *P. spinulicosta*, *Orthis*

At 225 in the stream bed there was a hard band at the bottom there are about 15' of ls. which is blue green and very hard and gritty. This ls. at the bottom is shaly concretionary but becomes quite pure in the middle band which is 10' or 15' thick. This zone contains *H. detrita*, *spidifera* (like those at canal section), *C. macronotus* c., & *C. scitulus*, a small cup coral, *T. caninus*, *T. bellulus*, *S. perplanaria*, *C. boethii*

These calcareous rocks occupy an interval of about 4'.

The rock below the ls. is hard and ~~concretionary~~ sandy. *Productella isombricata*,

The *A. scopi* 25 paces in

the stream.

About 320-347 in the stream bed there are little hard shales which give effervescence with acid.

Camarotoechia

S. andalus

Palaeoconcha

These rocks are especially fine grained and must belong to the horizon with the ls. in it. This ls and sh. is a very hard rock must be the same as that seen on the bank of Yellow Falls?

At 391 comes soft shale with the following fauna:-

- | | |
|-----------------------------|-------------------------|
| ✓ <i>T. carinatus</i> , etc | <i>M. concentrica</i> |
| ✓ <i>S. pugnax</i> | <i>C. boethi</i> |
| ✓ <i>C. vidua</i> | <i>Pal. concentrica</i> |
| <i>Spirifer</i> sp. | <i>M. subulata</i> |
| <i>P. flabellum</i> | <i>C. induta</i> |
| <i>H. oblongatus</i> | <i>Camarotoechia</i> |
| ✓ <i>P. spinulosa</i> | ✓ <i>M. concentrica</i> |
| <i>Retinopora</i> sp. | <i>O. pinnule</i> |
| <i>Par. halitoides</i> | <i>Pholidops</i> |
| <i>E. umbrina</i> sp. | <i>P. pinnule</i> |
| ✓ <i>A. umbellata</i> | <i>A. boydi</i> |

The great abundance of *T. carinatus* is very striking.

At 539 pass - 489 pass soft dark shales with excellently preserved *P. sulcamarginata*, *L. planitronica*, *H. oblongatus*, *Pal. concentrica*, *C. carinatus*, *S. pugnax*, *M. pugnax*, *H. trochata*, *L. loma*, *G. arcuata*.

The falls occur at 520 p.m.
The lower part of the falls has
abundance of *B. submarginata*
and some *L. harringtoni* all
very well preserved. *Ostracods*
and *Pal. concentrica* were also seen.
Concentrica are not infrequent in
these rocks.

0-5'5" - *B. submarginata*, *L. harringtoni*,
Pal. concentrica, *M. oblongata*, *Ostracods*,
M. pygmaea, *Palaeonchus* sp.

5'5"-10'10" - *M. oblongata*,
The shales in these two first
intervals are soft, and rather dark
grey.

10'10"-15'15" *C. setigera*, *L. harringtoni*,
Ostracods,

15'15"-20'20" Rock is becoming much
coarser and harder but this is
only local for a small interval and
the shale is quite like those
below but breaks into thicker
fragments.

20'20"-25'25" Shales break into large
pieces - *L. submarginata*, *B. submarginata*,
C. setigera, *M. oblongata*, *Panacea* sp.,
L. harringtoni,

25'25"-30'30" Shales blue grey, gritty
break into small pieces, *Spirifer*

30'30"-35'35" Shale break into
rather large pieces, large

Pelecypods have not yet come in
 25' 25" - 70' 70" - at 70' 70" the shales
 are coarse and here occur the
 big *Mediomorphus*, *A. boydii* etc.
 as in the collection.

At about 105' 105" girth shales have
P. discoides, *C. scitulus*, *Modiolus*,
Liopteria 2 sp., *C. detes*, *M. corbularis*
A. emarginata,

Between 120' 120" and 125' 125" the rock
 has become a very coarse sandy
 shale with *M. macrostomum*, *Liopteria* sp.,
Ophionotus sp., *P. flabellum*, *A. princeps*
S. murinum, *A. fasciatus*, *C.*
congregata,

At 140' 140" - was found a loose block
 of calcareous ss with *C. remora*,
P. flabellum, and abundance of
M. arcata.

The falls is about 152' high.

The very brink of the falls is over
 hard sandstone rock with *P.*
flabellum and round concretions
 just like the horizon at Electric Light
 stream. Other fossils are *C. concentrica*,
S. crotalum, *C. regulata*?, *T. virgata*,
M. multiloba, *C. remora*, *M. arcata*,
Gon. stramonius, *M. concentrica*,
Atthis, *Spirifer* sp., *C. muronatus*,
R. vancouveri, *A. princeps*,

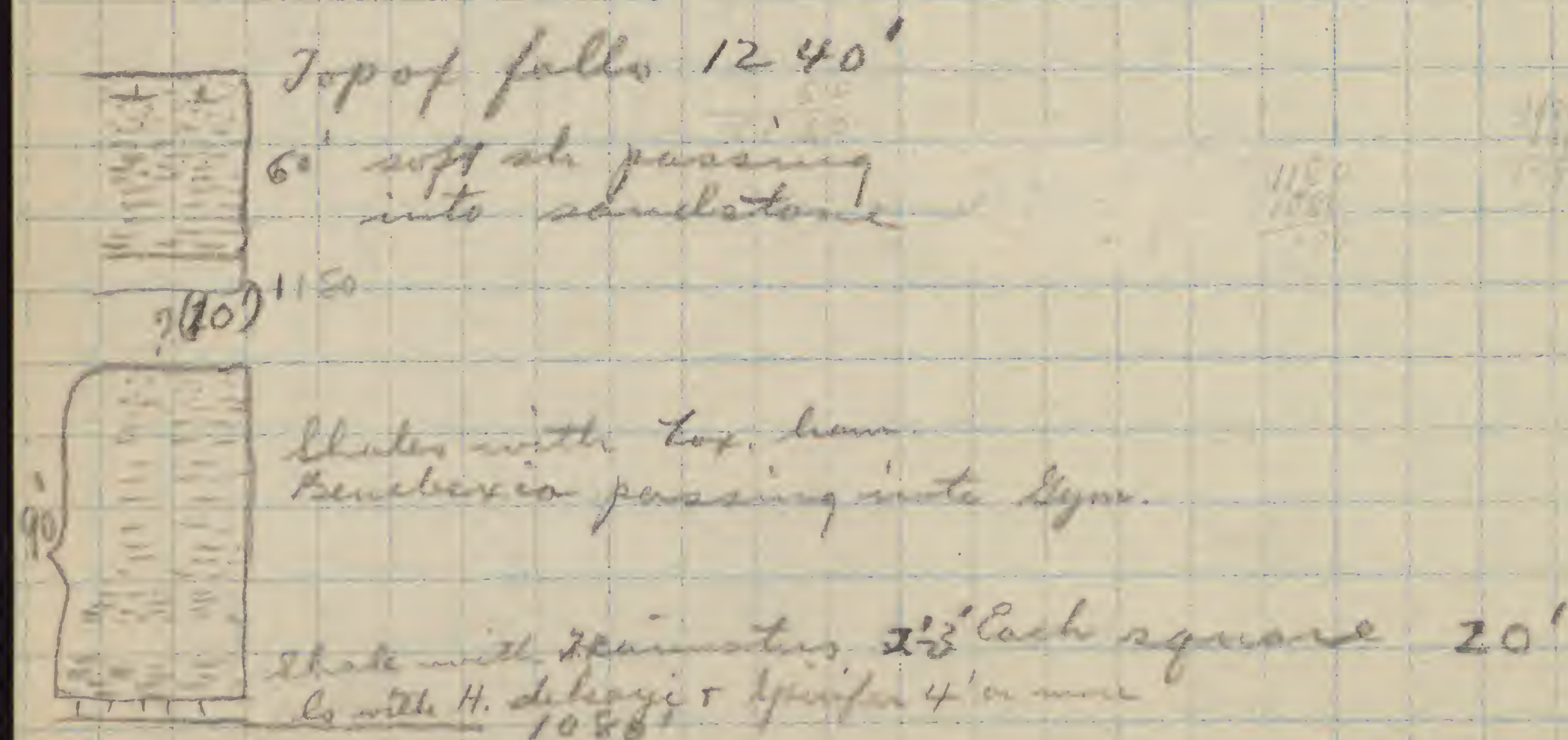
(1300')

Rock at a on top of hill is rather
 dark softish gith. ss with
 few fossils - *P. remora*, *Orthoceras*
 sp.

The falls at Pratt Falls

showed a continuous section of rock for about 170' from the lowest exposure noted. The topmost beds are the same as we have here on Electric Light Brook at the top of the falls. A hard layer occurs at about 1080' elevation and this hard band looks like the one we have in the lower falls at Chase's Glen. About 90' above this the rocks have many *Modiomorphus* and the typical aspect of the New Lynn Quarry. I did not see other beds here that carry *A. reticularis* nor any blocks of it in the stream bed, but a considerable distance below the brink of the falls, my recollection is that it is about 50' there was a sequence showing dark somewhat fissile shales, which stood in marked contrast to the coarser rocks above and below. These became coarser as the top of the falls was reached till they became a fine ss. with calcareous lenses made up entirely of fossils, notably *U. arguta*, *Reflubellum* and snails.

1300' dark shales, rather soft gritty.



The section at Pratt Falls is almost the same as at Upper Chase's Glen or in the Glen 5 miles NW of Morrisville.

The fossils at 182nd Falls are excellently preserved and the following were noted in large blocks from above:—

L. macroptera r
P. cybndrica rc
M. mytiloides
M. alta

M. concentrica
L. laura rc
S. granulosa r
N. triquetra

N. oblongatus
C. conigata

C. elongata
G. bivalveata

G. arcuata

P. flabellum

G. rugosa

J. submarginata

P. liata

Pal. tenuistriata

P. maxima

A. boydi

N. arguta

Sphenotus sp.

Cystolite

Orthoceras sp.

P. discoidum

A. fasciculatus

A. princeps

A. scabidus

S. crotalum c

Lingula delia

L. Olusa

L. aspidium

R. grandis

S. perplanus

Schuchertella arcto.

C. coronatus

C. mucronatus

P. spinulicosta

C. boothi

G. obsoleta

N. oblongatus

N. bellistriata

C. tenuistriata

Par. hamiltoniae

Leipteria sp.

O. undulata

P. radiata

B. leda

P. patulus

$$\begin{array}{r} 1620 \\ 60 \\ \hline 1130 \end{array}$$

$$1.5 \overline{) 100} \quad (66'$$

$$\begin{array}{r} 100 \\ 90 \\ \hline 100 \end{array}$$

$$\begin{array}{r} 1260 \\ 1060 \\ \hline 200 \end{array}$$

$$3.25 \overline{) 200} \quad (66'$$

$$\begin{array}{r} 200 \\ 1900 \\ \hline 30 \end{array}$$

$$\begin{array}{r} 61 \\ 66 \\ \hline 2127 \end{array} \quad (63'$$

$$\begin{array}{r} 2.6 \\ 63 \\ \hline 78 \\ 16 \\ \hline 1638 \\ 164' \end{array}$$

1416

1138

1139 W

$$\begin{array}{r} 1160 \\ 260 \\ \hline 1420 \end{array}$$

Sept 15.
Pratt Falls

1928

Below hard ls. layer ~~from~~ part
the rock is a shale, rather massive,
sandy. (0-300 paces) Erosion patchy.
At 315 paces the rock is the same in
lithology but less:

A. Hydrula c

Small corals

Thromaria a

A. umbonata

At 376 paces comes the hard layer about
1' thick and 5' above stream level.

This hard layer has about 10' of
hard sandy shale below it, on the
hard rocks were seen

A. umbonata

L. periplana

A. decussata

In a fossiliferous layer 3' below the
hard ls. was seen:

A. Hydrula c

Quartz stems

L. periplana

P. spinulosa

Small corals

Platyceras

T. carinatus

B. latic

P. gona

C. mucronatus

The lowest

A. umbonata

rocks seen were 58' below the hard
layers.

At 386 the ls. is in the stream bed.

Above the ls. comes a hard calcareous
shale for at least 75' becoming continually
coarser & culminating in deep fossiliferous
zone which is a rather hard shale
and the top of which is 16' above the
mouth of the layer.

T. carinatus

C. mucronatus

M. subulata

A. umbonata

B. submarginata

P. platyllum

P. carinatus

P. rhomboides

A. umbonata

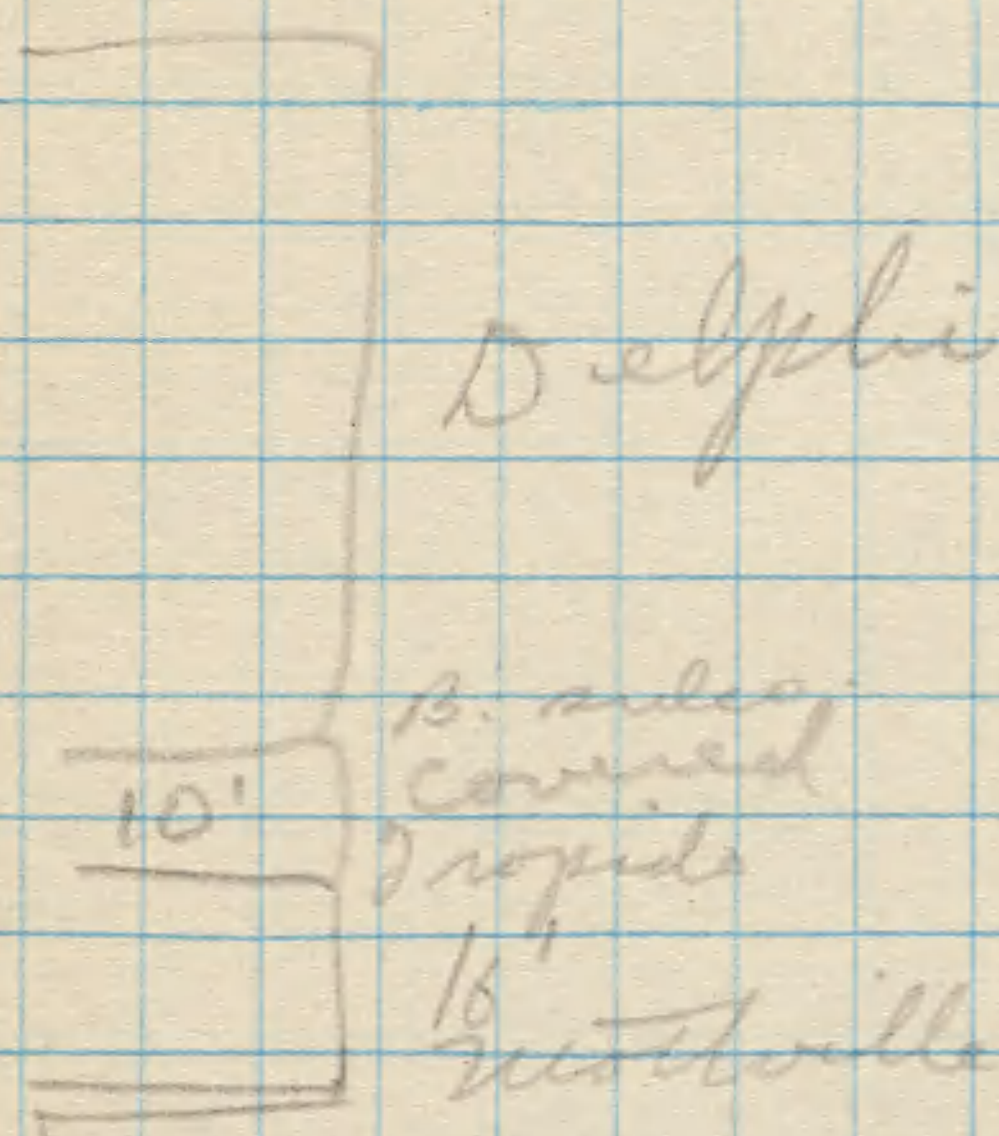
A. subulata

M. carinatus

A. erectum
A. decussata
C. corrugata

M. concentrica
C. elongata
P. litta

10' from top of *Tropidoleptus* bed to base of
 falls covered. Pompey 11 steps or 55-60'



Sept 3, 1927

Delphi Falls.

1408
1260
3720

About 300 paces upstream and
3 steps above stream level
N. ro. dalli and *P. lirata* are found
At 4 steps *A. erectum*.

Between 11 & 12 steps up the shale is
coarse and sandy. Fossils were seen
P. lirata, *C. recurvum*, *P. haughtoniae*,
P. spinulicosta, *S. arctostictus*, *S. granulosus*,
L. macropterus, *A. fasciculatus*, *Leptotaria*
sp., *H. thurcata*, *S. crotalum*, *P. spinulicosta*,
S. crotalum, *H. rugosa*.

A. calcarosa lens 6" above the twelfth
step has *A. cora*, *A. reticularis*,
Cyrtodictya, *Cranella* larva, *A. boydi*,
S. arctostictus, *Orthoceras* sp.,

At this same place ~~between~~
~~steps~~ about 40' above stream about
400 paces from the bridge and about
at the elevation of 1035' there is a
ridge of sandy rock about ~~2-2 1/2~~^{2-2 1/2} thick
and above this up to the 12th step
the rock is sandy but not so
compact as the band at 1035'. This
band I take to be the same as
that at 1275 on the Cozenovia road
to Opau. Fossils observed in it are
~~*A. fasciculatus*~~, *M. mytiloides*, *A. p. rugosa*

5'5" - 10'10" above 20th pass - in a small gully
 for *U. laevis* becomes common.

U. subulata

U. ravidalli

P. rana

Pal. concentrica

L. laura

C. brevis

P. lirata

At 5 steps above the stream just below
 the falls and at 32'8" above 1095'
 the rocks at the bottom of the gully
 are soft shales breaking into small
 pieces but become progressively
 coarser and break into larger
 fragments. Fossils from 30'30" &
 35'35" are:-

Pal. sp.

P. lirata

U. tigrina

U. submarginata

P. stipitata

B. sulcata

At about 1035' the rock is a piece
 and the hard band seen just
 downstream is again encountered.

The top of the hard band is at
 40'40" or 1038'4". It is about
 4' thick. The shales have become
 progressively coarser to just
 below this band, but the band is
 very hard and resistant and
 stands out in contrast to the
 rocks below. On the band the
 shales are somewhat like those
 just below the band as they
 break into heavy pieces.

Fossils in the hard band are
P. flabellum, *A. fasciculata*,

In the coarse shales above the
 hard band were found:-
U. modesta *U. arguta*

2

Between 25' 25" + 30' 30" above the
band band the rock is coarse &
sandy & has *A. boydi*, *P. discoidum*,
S. granulatus.

Between 30' 30" + 35' 35" calcareous
lenses contain *A. rosa*, *C. coronatus*,
P. flabellum, *M. acila*, *A. actinaria*,
A. boydi.

The top of the first catasact is
at about 1070' A.T. and falls over
rock just quite at the top of the
New Lynn horizon.

Ch. a loose slab from about
30 or so feet above the band band
were seen *L. obsoleta*, *M. cyathoides*,
A. granulatus, *A. princeps*, *A.*
cratellum, *H. arguta*, *P. trivincatus*,
M. cyathoides.

At 152' above the band band the
rock is a sandy stone breaking
into coarse flat slabs ^{out} ~~with~~ ~~the~~

~~But that~~ but that just below
~~is coarse & breaks~~
~~into irregular~~
blocks. This has *S. perplanus*,
L. obsoleta, *A. thyrus*, *A. princeps*.

The rock between 40' 40' and
30' 30" contains -

A. reticulatus

Zaphrentis sp.

C. coronatus

M. cyathoides

C. alungus

A. boydi

P. flabellum

H. arguta

The layer with the Zaphrentis corals occurs at 39' 40" above the hard band or at about 1025' A.T.

The coral layers seem to be thin and discontinuous, judging from this small exposure.

The lower falls are peculiar in that the ledge ^{rather} ~~continually~~ ^{continually} toward their base and there are not sudden cuts; the water plunges over in two streams.

The top of the first estuary (very brack) is at 1070' 5" - it is just about 70' from the base of the falls and there are about 8 or 9' of rocks exposed from the base to 204 steps upstream from the bridge.

10' 10" + 1' above the brink of the falls comes the top of the New Hgn horizon that is at 10802' 3".

The rocks on the brink of the falls and for the 11' above the brink are hard and massive and give an appearance like acid. The rock breaks into rough irregular pieces. It is the typical rock of the horizon exposed at the great geyser.

Fossils noted in the 6' above the floor of the ~~apparent~~ ^{river} ~~river~~ ^{bed} above the brink of the falls are noted below. There are 5' exposed above the brink of the falls:-

A. brychi
M. phyllodes c.
P. flabellum
P. lirata
P. gracilipes
L. carolinensis
P. sp.
Atthis sp.

L. macroptera
C. muscivora
A. princeps
S. sp.
L. truncata
M. concentrica
C. brychi
H. sp.

Fauna of hard rock
about 1' thick from bank of
upper falls:-

<i>E. lindblomi</i>	c	<i>P. rana</i>	re
<i>P. flabellum</i>	re	<i>C. minoratus</i>	re
<i>F. stellata</i>	r	<i>Tentaculites</i>	sp. re
<i>S. perulana</i>	r	<i>P. lityrus</i>	sp. re
<i>A. brydi</i>	r	<i>C. h. h. h.</i>	re
<i>C. boethi</i>	r	<i>A. princeps</i>	re
<i>M. angusta</i>	r	<i>C. rotata</i>	r
<i>C. coronatus</i>	r	<i>M. dekeri</i>	r
<i>A. cora</i>	re	<i>Productella</i>	sp. r
<i>Cyrt. h. h.</i>	re	<i>Orthoceras</i>	sp. r
<i>C. recurva</i>	re	<i>Gomphoceras</i>	sp.

This represents fairly well the
fauna of the 1' or 15' of sandstone and ls
forming this horizon. I did not
do a great deal of collecting in these
rocks but from the little I did do
some differences could be noted in
the faunal composition. There was no
great abundance of *Camarotoechia*
with the *Enellas* but they do exist
in the shales below this horizon.
Further there was not the large
abundance of *Nyassas* as seen at
Prest Falls. These lenses of ls must
be quite variable and this would
account for the differences. I believe
that the *Enellas* and *Nyassas* belong
in the same horizon?

*H. dehaenzi**Pan. hamiltoniae**A. ceras**S. truncatus**B. bivalveata**P. bracte**A. fasciculatus**P. spinulicosta**P. rana*

For a few inches on the top of the
Lyon horizon it becomes shaly
and passed into a dark shale.

On the top of the new Lyon
horizon which here does not end
with a band of *Atrypas* and
C. coronatus comes dark shale,
very dark grey in section but
weathering down to an ashen
grey and breaking into thin flat
chips.

*H. elongatus**H. triseriatus**Tropidospira**C. scitulus**Can. ant. toechia* sp.*C. congregata**M. mytiloides**S. chelungensis**Can. Thun.**Leptæna* sp.*C. mucronatus**M. concentrica*

These shales have become progressively
more harder and at the 6th step
breaks into rather large fragments.
Between 7 & 8 steps the rock has
P. flabellum and is very much coarser.
From 9-11 the rock is a sandstone
and contains calcareous lenses
and layers with the fauna given
on previous page from the drift slab. The
base of the upper falls is at 1142'
A.T. Where this position was hand-
levelled the upper ledge of ss comes
at about 3' above the 11th step
over the new Lyon, and thus at
Delphi falls from the top of the
new Lyon horizon to the top
of the Electric Light stream bed.

is 59' 7".

Some of the stone at the brink of the upper falls is a rather pure ls. *Orthis*, *Spirifer*, *Pterinea* and *Hyman* are common in the upper layers. The jointing is rectangular, one set intersecting NW-SE.

The total height of the two falls combined is 144'.

On top of the upper falls come about 30' of dark almost black shales, which are fissile, then are argillaceous shales. They have *M. pygmaea*. Toward the bottom there are ^{massive} sandy layers like those on top of the Boonville ^{Member}.

A. umbonata

L. laevis?

P. fragilis c

L. francella

L. lachrym

M. triquetra

C. crinitus small. *Orthis* small.

In places the shales are slabby and sandy.

About 200 paces upstream a bank of these shales of about 60 or 70' is exposed. Thin ss. layers can be seen throughout the mass. The shale at the bottom for about 20' is fissile & very dark.

457 paces upstream dark bluish soft sh.

L. lachrym

They have calcareous concretions.

At 980 paces 4' above stream
is a 2" cross-bedded ss.
which stands out as a bench
or ridge along the cliff. The
shale ^{is} ~~is~~ vertical here
to or 70'. At 1107 it is in the
stream bed. There are cascades
down.

At 1284 paces from the brink
of the falls comes the highway.
and the river flattens out
considerably.

A slab with *Pteridites* ^{fragments} & *Rhipidomella*
& *Lamella pinnata* probably belongs in
these upper shales.

Stone Quarry hill
 Coarse shale and sandstones
 with
L. laura
Conodontoschia sp

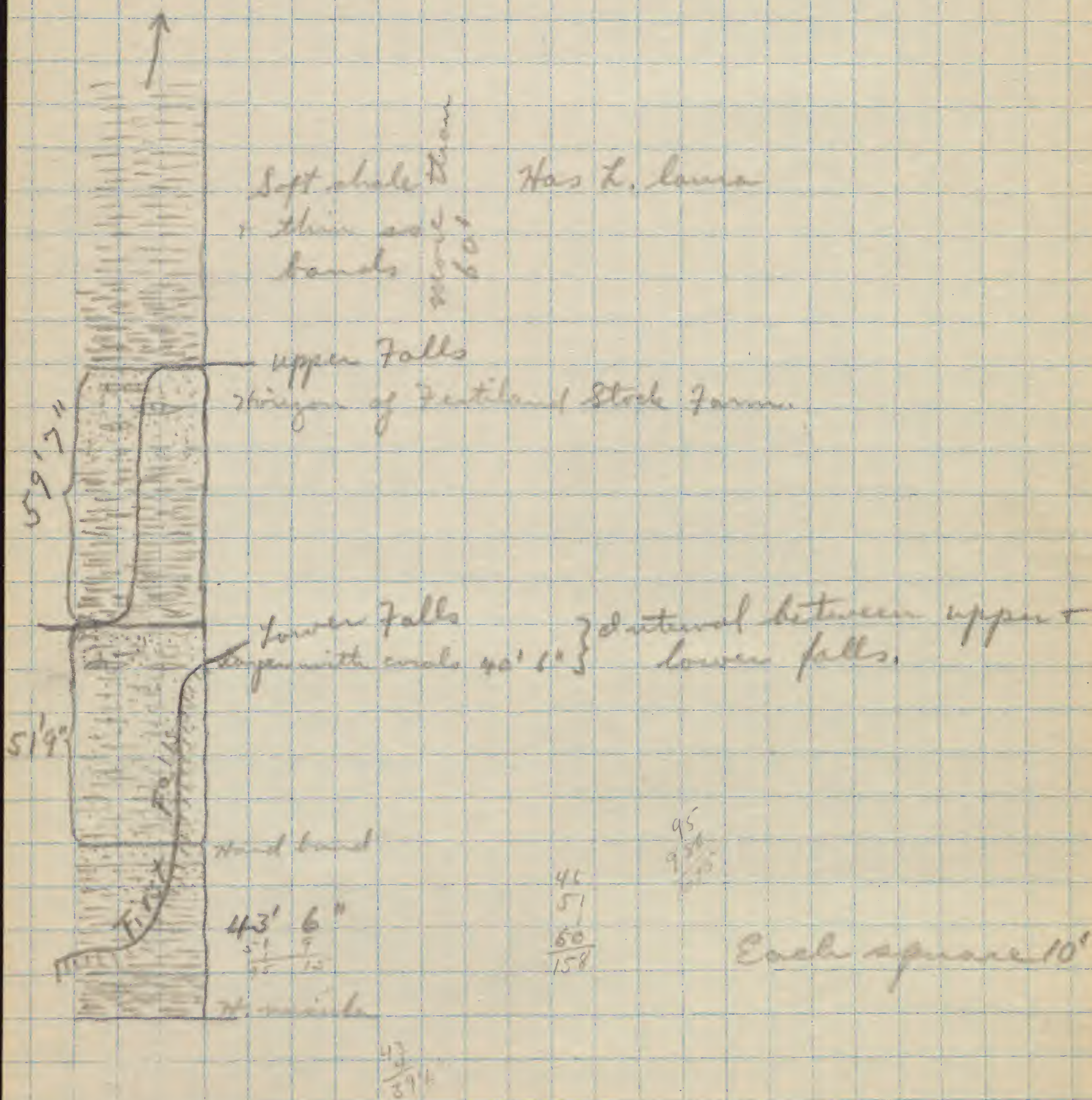
Sandstones are exposed at the
 bend on top of the hill in
 these H. deKayi, O. beczyi?

Quarry 90 paces long about 25'
 high. This was composed mostly
 of dark blue grey shaley sandstones
 containing *L. laura* distributed
 thru out. The rock probably belongs
 somewhere near H. Quarry horizon.
 It is quite definitely Ludlowville
 and must be near the top of the
 sandy rocks above the Nyassa & Emella
 zone.

195

195

Section at Delphi Falls



The lowest rocks contain *Formotoma micula* and a fauna such as is found on the soft shales with *Pholidops*. The fossils, especially the *Gastropods* are excellently preserved in this horizon. *Bembexia* predominates over the other forms.

About 10' above the zone the *Forams* become quite abundant. These soft dark shales with *Bembexia* etc. soon become sandier and break into rather large fragments and this takes place between 35' & 40' above stream. At about 1031' is a $3\frac{1}{4}'$ band of hard sandy and slightly calcareous rock which forms a marked ridge along the cliffs but loses its identity in the face of the falls. Above this band for about 51' 9" the rocks are rather coarse being sandy sh for about 30' but becoming finer above with frequent calcareous bands and lenses composed mostly of fossils. One of the best *Siphonotis* corals at about 40' 6" above the hard band.

The top of the *Sym* horizon here is not marked by calcareous lenses of *C. coronatus* and *A. reticularis* + *A. cor* but is a transition of a few inches into a rather dark soft, sub-fissile shale. These shales again become coarser and the fossils larger till sandstone appears. The *Fertile* of *Stock Farm* horizon is about 15' thick or more the exact line could not here be determined.

On the rap falls the alternating series of fine shales and thin ss have the appearance of similarly situated rocks in the Bear Mtn. ravine.

and thus at the ¹⁹⁷ top of the ¹⁹⁷
fertile horizon is probably where
the line dividing ^{the} Ludlowville from the
Shenandoah comes. As I recall it this
horizon at Fallows Falls including
the rock in the stream by the road
is near 100' thick. •

List of exposures to be
Photographed

Marcellus - with conventional $\frac{1}{2}$ mi. N.E. of base
Cordiff - Road cut south of base

$$\begin{array}{r}
 1253 \\
 25 \\
 \hline
 1195 \\
 25 \\
 \hline
 1220
 \end{array}$$

$$\begin{array}{r}
 1253 \\
 12 \\
 \hline
 1193
 \end{array}$$

$$\begin{array}{r}
 1253 \\
 2 \\
 \hline
 118
 \end{array}$$

$$\begin{array}{r}
 2502 \\
 118 \\
 \hline
 118
 \end{array}$$

On the east side of the Tunnel the
Mottville hard band is about 3' above the
tracks at the Tunnel entrance but passes
east on the tracks it is at the
level of the tracks & disappears.
Above the hard layer is about 20' of
the hard brittle shale. Fossils are rare
and scattered but the following were
seen:

<i>L. perplan</i> (large)	<i>Productella</i>
<i>A. andacula</i> (large & small)	<i>Camantocchia</i>
<i>P. flabellum</i>	<i>Gaunmyia</i>
<i>P. caninatus</i>	<i>B. sulcomarginata</i>
<i>P. radiata</i>	<i>H. delanyia</i>
<i>C. quincunatus</i>	<i>C. boothi</i>
<i>P. liata</i>	

There is a possibility that the rocks
here referred to as the Mottville hard
layer are actually the beds above the
Rehnsport. It is absolutely paramount
that these two horizons be established
separately. The abundance of presence
of *Camantocchia* & the abundance of
A. andacula suggest this correlation
but the 20' of hard shale seems to
point toward this being Mottville.

From the E side of the tunnel to the road
crossing were 13 steps, from the W side
15 steps, both measured from the hard
layer. This puts the listed layer at about
1175' A.T. or 1184', probably 1190 is about
correct.

Aug 30.

On Tully with Von Englen & Zimmer

$$\begin{array}{r} 81 \\ 810 \\ \hline 891 \end{array}$$

$$\begin{array}{r} 475 \\ 276 \\ \hline 751 \end{array}$$

$$\begin{array}{r} 800 \\ 5 \\ \hline 805 \end{array}$$

$$\begin{array}{r} 2700 \\ 33 \\ \hline 2733 \end{array}$$

$$433$$

$$810$$

$$1243$$

$$40$$

$$10$$

$$50$$

$$100$$

Sept. 5. 200

1927 200

Handlevelling begun at 1245'

Lower South of Fabius

3 steps - blue grey shales with
O. carinata, *M. triquetra*, *T. carinata*
M. varicosa, *M. oblongatus*, *P. concentrica*
S. tellus

4th step about 10' of ^{sandstones} ~~shales~~ exposed
 They are shaley below and gradually
 become sandy above. *S. pennatus*,
B. submarginata?, *P. emarginata*?
 The top of the ss, which is bluish
 and heavily bedded is at 6th step.

The top layer is calcareous and
 has many shells in it, especially
 small *Spinifers*, *A. umbonata* and
T. carinata.

The top fossiliferous band is about 20"
 thick. The ss below yielded few fossils

30-35³⁵ - Blue grey gritty shales breaking
 into small fragments. These have
 at the base

✓ *C. coronatus*
 ✓ *T. carinata* c
 ✓ *C. bellistriata* c
 ✓ *P. flabellum*
 ✓ *D. sculptilis*
 ✓ *M. concentrica*

✓ *P. flabellum*
 ✓ *S. pennatus* c
 ✓ *S. arcuata*
D. magna?
 ✓ *A. spinifera*
 ✓ *C. scutellus*

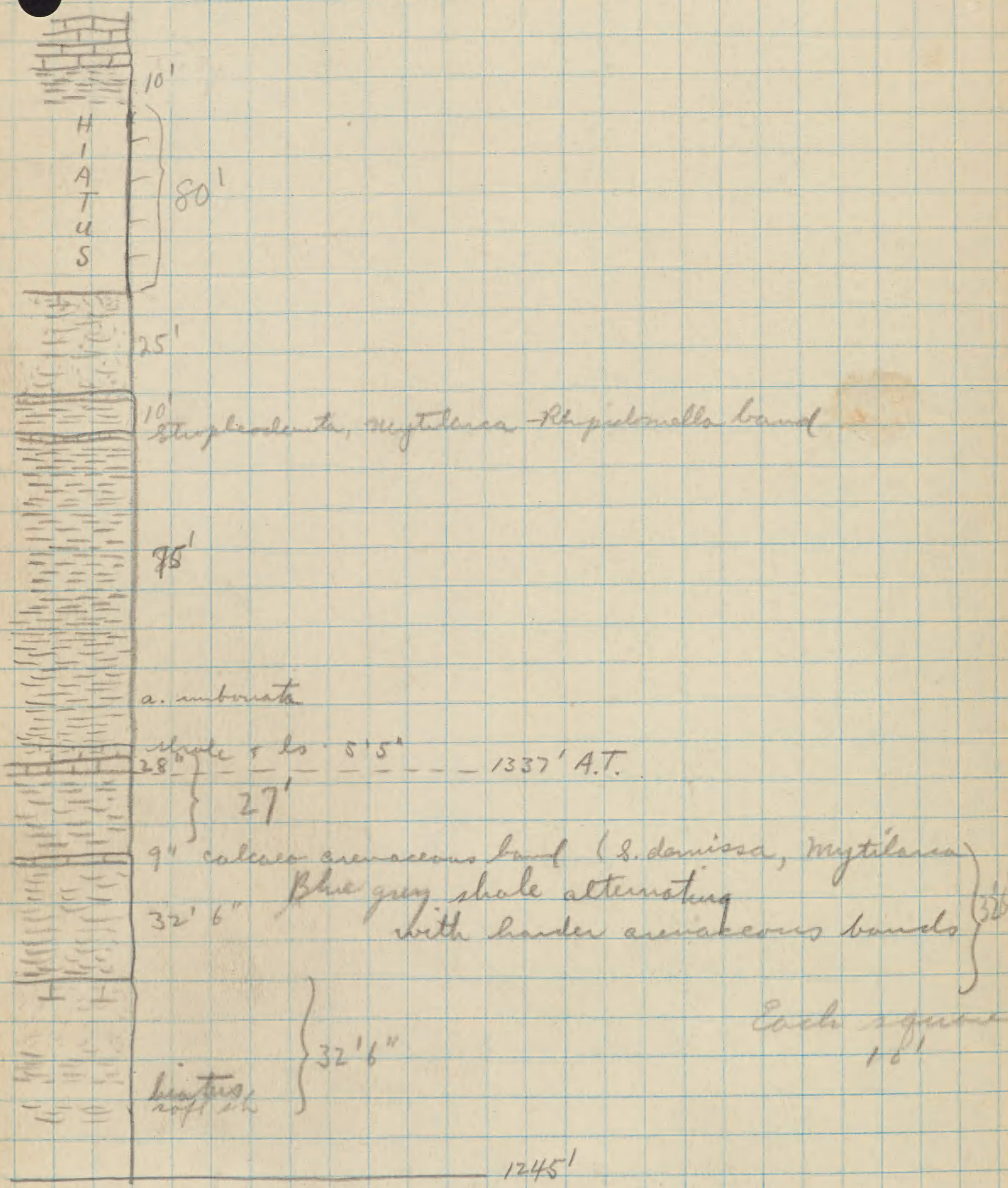
35-35 to 40-40" Same as below as to fauna
 but becoming much coarser

G. hamiltonensis

Lepteria
Tremus

40' 40" - 45' 45"

Same - *S. perplana*, *A. spinifera*,
A. reticularis, *P. flabellum*, *P. emarginata*



C. bellistriata
C. coronatus

P. patulus
H. oblongatus

45'45" - 50'50" - same shale - *H. dekeyi*
 50'50" - 55'55" Rock coarser forms
 a cascade and is less fossiliferous
Camarotoechia congregata, *T. carinatus*,
H. dekeyi, *S. pennatus*. At 55'55" the
 rock is hard rather thick bedded
 light brown ss.

55'55" - 60'60" comes a hard band of light
 blue gritty ls. with

C. boethi
S. pennatus cc
S. tullius
H. dekeyi
S. demissa

65

65
 32 6"
 52 6"

This stone is about 9" thick

60'60" - 65'65"

On this is a sandy rock with many
 fossils

P. flabellum
T. carinatus
S. demissa c
P. oviformis
S. granulatus
R. vanuxemi

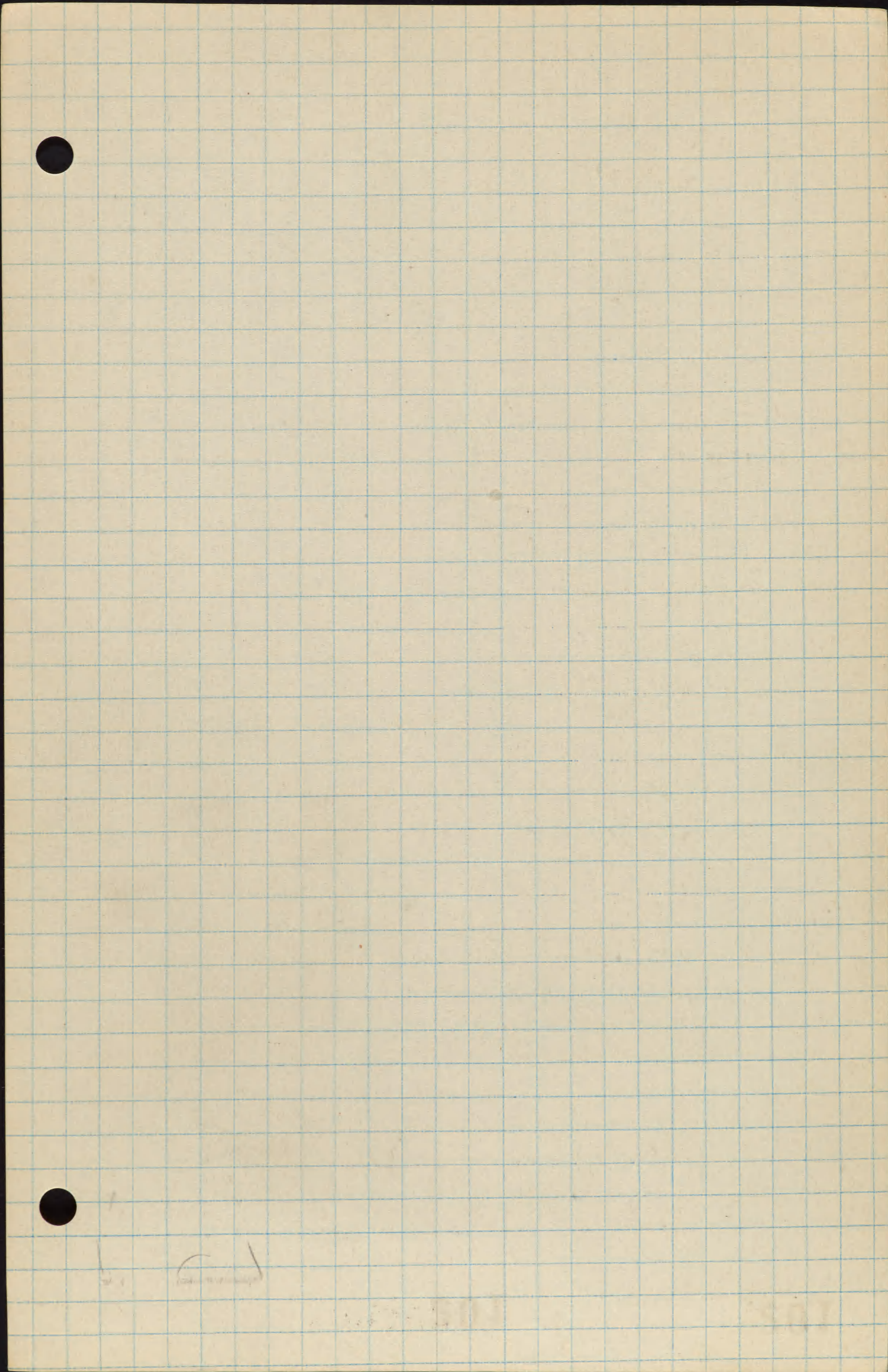
P. princeps
S. pennatus
A. serpens
S. perplana
M. concentrica
C. bellistriata

A little higher up the rock is softer
 about 10' below 65'65"

These softer rocks contain

S. pennatus
S. granulatus
S. perplana

S. 9
P. oviformis
T. carinatus



Chaetetes

These shales have the look of those below the *S. demissa* band. The coarse rock for about a foot above the *S. demissa* band must belong to it also.

65'65" - 70'70" - hiatus

70'70" - 75'75" - blue grey shales

75'75" - 85'85" - *Pal. concentrica*, *S. pinnatus*, *C. bellistriata*, *T. carinatus*, *S. granulatus*, *C. scutellus*, *Grammysia* sp., *C. tenuicinctus*.

85'85" - 85'85" - At the top of this interval comes a 28" band of blue grey ls., shaley in places but compact or subcrystalline in others. It has *S. perflora*, *T. carinatus*, *Camerozoechia* sp., *S. granulatus*.

85'85" - 90'90"

In its weathering & fine grain it is not unlike the Tully but is much darker. It has markings like furcoids or plant stems. In places where fossils abound it is subcrystalline.

The upper ⁴⁰⁵ 3" are quite dark and gritty.

The interval of rock for 5'5" above the ls. is a hard calcareous shale with *Cyathophylloids*, *S. pinnatus*, *T. carinatus*, & *Crom. lamingtoni*.

A hard band of ls. about 3-6" thick ends this step. Abundance of

T. carinatus was noted above the Tichenor in the Bucktail ravine at Spafford Valley. A coral was seen in this ls. at 90'90"

90'90" - 95'95"

Bluish shales succeed this ls and they have:-

S. pinnatus cc
J. carinatus cc
Pal. concentrica c
C. boothi
U. triquetra

M. pygmaea
C. scintillus
N. corbulariformis
P. discoideum

95'95" - 100'100" - hiatus

100'100" - 105'105" -

105' - 105" - 110'110" - At 105'105" a very small exposure reveals bluish shales with abundance of *A. umbonata*, *C. coronatus*, *C. mucronatus*, *M. concentrica*, *A. spiniferoides*, *R. frimbriata*, *P. emarginata*, *R. vanuxemi*, *P. plana*, *S. andaculus*

110'110" - 115'115" - hiatus

115'115" - 120'120" - hiatus

120'120" - 125'125" - Blue grey shales,

U. triquetra

125'125" - 130'130" -

Blue grey shales with - *C. bellistriata*, *C. scintillus*, *P. discoideum*, *P. plana*, *U. lirata*, *U. varicosa*, *C. setigerus*, *M. pygmaea*, *Loph. ham.*, *U. triquetra*, *H. deKayi*, *P. plana*, *P. tenuis*, *P. plana*, *P. oblata*, *S. pinnatus*,

135'135" - 140'140" -

J. carinatus, *P. plana*,

140' 140" - 145' 145" same as above

145' 145" - 150' 150" - *P. discordum*,
S. perversa, ^{15'}
15

150' 150" - 155' 155" same blue gray shales

155' 155" - 160' 160" - *P. concentrica*,
C. mucronatus, shales for most
part not greatly fossiliferous

160' 160" - 165' 165" - *C. tenuistriata*, *S.*
granulosus, *C. coronatus*, *T. carinatus*,
R. fimbriata, *E. papyriformis*, *S. arcuata*

165' 165" - 170' 170" - a foot above ~~165' 165"~~
is a hard band, *S. pinnatus*, *R. variegatus*,
A. reticulatus, *S. granulosus*, *M. oviformis*
This band looks like the horizon
with *P. oviformis* at Georgetown.
R. fimbriata, *S. inaequistriata*. In
places it is highly calcareous.
S. concava. This band is about 3-6".

170' 170" - 175' 175"

In this band are 10' of rocks with
1 1/2' of sandy shale at the top. *Taenium*
and large *Strophodontes* are common
here.

175' 175" - 180' 180" coarse shales, sandy,
irregular fracture *P. patulus*, *C. leptus*

180' 180" - 185' 185" - same

185' 185" - 190' 190" - minus 1' - a hard
calcareous - sandy band with gritty sh
as above.

Above this are about 10' of shales with occasional thin sandstone bands. *S. pinnatus*

Tully:—

Below Tully about 1' of dark shales with *D. carinatus*, *P. arcuata*, *S. pinnatus* etc, *A. spiniferoides*, *S. laevigatus*, *M. phylloides*, *M. orbiculiformis*, *P. acuminata*. The rock just below the Tully is rather coarser, shaly with few fossils. The lowermost layer of Tully is thin and shaly.

*⁵ up from the base of *H. cuboides* is abundant in a thin layer. The rock in the 4' is quite soft for 4' above the 1 1/2' of hard slate at the base is dark blue grey shale. 1' from the bottom *H. cuboides* is associated with abundance of *S. pinnatus*.

The Tully is at about 1525 A.T. on the farm of John W. Hartnett.

The *Sherburne* was seen at 1660 A.T. The Tully is seen ~~at~~ under the bridge in the gully but not beyond. Nearly 20' of Tully are exposed, and about 6 or 7 of the *Madison* below.

Sept 11.

Fabius Ravine

The one foot band of shell ls is rather pure for 6" on the bottom and here has many shells but above it becomes quite shaly and passes into shale. In the upper 6" *C. coronatus* is very abundant. Other fossils are *J. carinatus*, *S. perplanus*, *S. pennatus*. Two doubtful shells are *S. demissa* and *P. covenensis*.

In the shale on this band that forms the falls has:-

<i>P. flabellum</i> or	<i>S. pennatus</i>
<i>C. coronatus</i> c	
<i>J. carinatus</i> c	
<i>P. ob. concentrica</i>	
<i>C. bellistriata</i>	

The shale on the falls for about 3 or 4' abundant in *S. pennatus* & *J. carinatus*. *C. coronatus* appears to be limited to the horizon at the brink of the falls. The *S. pennatus* are all long-winged. Fossils noted in the upper shale are:- *S. pennatus*, *J. carinatus*, *S. arcuata*, *P. radiata*, *N. trigona*, *N. oblongatus*, *Pal. foveolata*, *M. pygmaea*, *Amnicolapora* sp., *C. scutellus*, *C. sphaeroides*, *D. sculptilis*.

Fossils about 8' above brink of first falls:-

Gon. humiltonensis
C. bellistriata
S. perplana

J. exigua
Tentaculites sp
B. crenistris

0-0 — 10' 10" —

J. carinatus cc
S. pennatus c
A. princeps ~
A. erectum ~
M. concentrica
C. scitulus
A. reticulatus

C. bellistriata <
S. rugosa
P. rana
~~*A. spiriferoides*~~
✓ *P. flabellum*
✓ *A. spiriferoides* ~
✓ *P. lanceolata*

Lenses of shell ls. are to be noted here made up of *S. pennatus*, *J. carinatus* + *C. scitulus* + *C. bellistriata*

10' 10" — 20' 20" — the rocks between this interval become sandier. The fauna here follows:-

H. dehayi
✓ *S. pennatus* c
C. bellistriata
✓ *J. carinatus*
C. corrugata
✓ *S. chertungensis*
P. flabellum ~.

P. liata ~ *W.*
M. bellistriata
M. liata
G. arcuata
P. lanceolata
✓ *S. granulosus*
M. concentrica
P. patulus

20' 10" — 30' 30" + 2' Shale becomes a
yellow brown ss. with
P. flabellum c *M. concentrica*
S. perplana *C. coronatus*
T. carinatus c *S. pennatus*
 Wood.

The last 1 1/2' of this ss. becomes calcareous.
 At 25' 25" this ss. has large
 spherical concretions with fossils
 of *S. pennatus* & *T. carinatus*.

The top of the falls at 32' 30" above
 the first falls has a blue grey sandy
 ls. crowded with fossils in places
S. demissa *S. tullius?*
S. pennatus *S. capillaria*
H. dehayi
C. boothi

This goes into a gritty sh. with
 Jaconthos.

P. flabellum

About 2' above, the shale is some-
 what limy and has the following

✓ *A. reticulatus* re.

✓ *P. flabellum* re.

✓ *T. carinatus* cc

✓ *C. induta*

C. boothi r

Platyceras sp.

✓ *S. demissa* re

✓ *P. obiformis*

Cystodictya

✓ *S. perplana*

A. bulbosus

✓ *A. princeps*

✓ *S. granulatus*

✓ *G. serpens*

Pentacrinites

A foot or 2 higher up the shale is bright blue grey and has in

✓ *C. coronatus*
 ✓ *M. concentrica*
 ✓ *S. densa*
 ✓ *A. reticularis*
 ✓ *P. oviformis*
 ✓ *P. flabellum*
 ✓ *C. bellistriata*

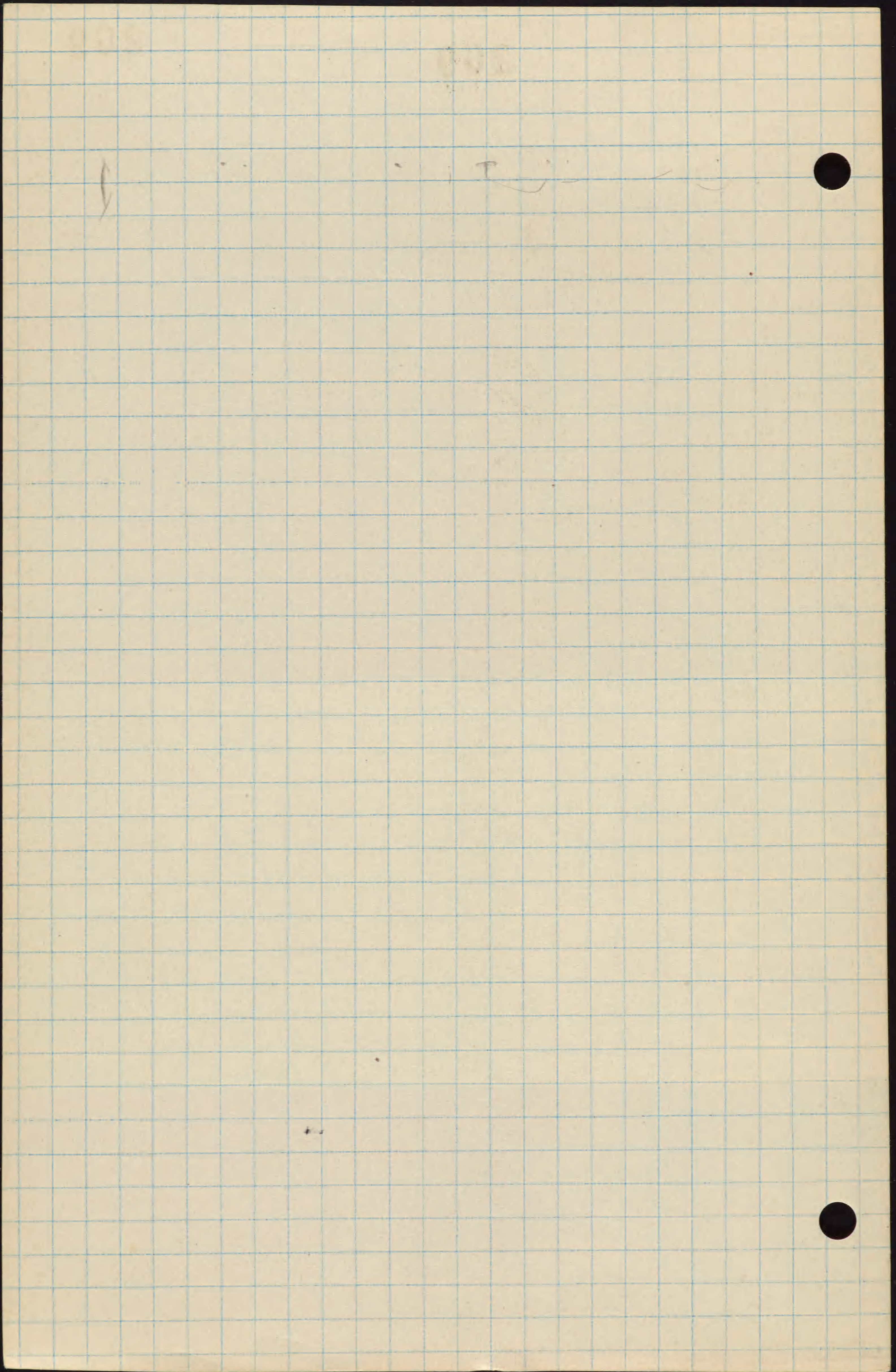
✓ *S. pennatus* cc
 ✓ *T. cuneatus*
 ✓ *S. perpluma*
 ✓ *C. scitulus*
 ✓ *S. capillaria*
 ✓ *Par. hamiltoniae*
 ✓ *S. granulosis*
C. boothi

In the ten' feet below the "Tichenor" fossils are abundant but of few kinds. *C. scitulus* abounds. *S. pennatus*, *Pterinopentem* and *Goniophora* are also present. The so-called Tichenor comes at about 1336 or 1340'

Tichenor

About 28" thick smooth blue grey ls. weathering to a tawny or yellow grey. It has the appearance of the Tully. The lower portion of the lower layer for about 1/2' is very fossiliferous, the middle, almost not at all, the upper layer has some crinoid debris and a few shells as *S. granulosis*. There are 3 layers, the upper 3 1/4" thick, the middle 11" thick and the lowest layer 11".

An inch of shaly ls. on the bottom has many specimens of *C. scitulus*



On top of the Tishum or there is
about $1\frac{1}{2}$ ' of shaley ls. quite
resistant and with *S. pennatus* &
abundance of *T. carinatus*.

Ravine at Keeney
Handlevelling at 12/8'

At 16 steps + 2' occurs a hard band
in the stream with 4' 6" of ~~shale~~
shales below. The shales below are
blue grey and are only very slightly
quitted. They contain a few thin
fragments of *Palma* but the following
individuals were observed:

<i>I. carinata</i>	<i>C. setigera</i>
<i>S. pennatus</i>	<i>C. scutellus</i>
<i>O. texensis</i>	<i>M. pygmaea</i>
<i>L. brevirostris</i> or	<i>N. thalassius</i>
<i>C. circularis</i>	<i>S. capillaris</i>
<i>P. setus</i> sp.	<i>O. undulata</i>
<i>M. elongatus</i>	<i>C. bellistriata</i>
<i>I. submarginata</i>	<i>S. cristatus</i>

On these shales comes a 1' band of
slightly honeycombed shale with
S. blanchardensis

<i>I. carinata</i>	<i>Schuchertella</i> sp.
<i>S. angulatus</i>	

On the hard band are shales like
those below with

<i>L. brevirostris</i>
<i>B. leda</i>
<i>M. corbuliformis</i>
<i>I. submarginata</i>
<i>N. bellistriata</i>

210

Between 17 + 18 steps the following
in a shale

<i>M. exilis</i>	<i>I. submarginata</i>
<i>Diopatra</i> sp.	<i>I. carinata</i>
<i>C. scutellus</i>	<i>O. undulata</i>
<i>C. setigera</i>	<i>P. radiata</i>

N. bellistriata *Spermatis*
The strata are blue gray and
break into regular flatly
cliffs.

S. arcuata

O. bicolorata sp.

C. coronatus

T. acuminatus

P. patulus

M. concentrica

S. granulatus

S. papilion

A local banding of the rock
between 19 & 20 caused a 3' cascade.

N. triquetra

P. rana

20-21 the rocks are rather sandy and
form a 3' cascade in the stream.
Fossils at 21 are *Pal. concentrica*,
T. acuminatus,

21-22 —

N. varicosa

N. bellistriata

C. tenuicinctus

C. scutellus

C. boathi

P. rana

C. bellistriata

S. solenoides

M. caninata

Prodictella sp.

S. pennatus

S. ellipticus

B. lida

C. boathi

Pterinospecter

A. caninata

S. pennatus

M. pyramis

N. elongatus

S. arcuata

C. mucronatus etc

S. scutellus

S. coquillina

C. tenuicinctus

T. acuminatus

Pgl. concentrica

P. emarginata

One foot above the 22nd step
was found a 6" band of
calcareous-arenaceous rock with
S. pinnatus *C. mucronatus*
A. umbonata *Homophora* sp.
E. punctata *S. macræyi* ?
P. rana *S. pinnata*
S. granulosa *E. litchfieldi*
C. tenuistriata *Can. lina*
Orthoceras sp.

This stone also contains small
black concretions.

Above this hard layer at
23 the rock is shaley and like that
below the hard band. It has

<i>I. geminatus</i>	<i>S. pinnatus</i>
<i>P. lanceolata</i>	<i>M. pygmaea</i>
<i>C. recurva</i>	<i>R. linnæi</i>
<i>M. pygmaea</i>	<i>E. scitulus</i>
	<i>Cyrtodictya</i> sp.

23-24

<i>Pal. concentrica</i>	<i>M. varicosa</i>
<i>S. pinnatus</i>	<i>M. litta</i>
<i>P. rana</i>	<i>Pal. tenuistriata</i>
<i>M. triquetra</i>	<i>P. mitta</i>
<i>B. cristatum</i>	<i>A. umbonata</i>
<i>M. varicosa</i>	<i>M. pygmaea</i>
<i>D. arcuata</i>	<i>Pal. Hamiltonian</i>
<i>S. arctostriatus</i>	<i>P. mitta</i>

24-25 — *litta*

~~to 27~~

At 26+7 comes a 3" band of
hard rock with a prominent
this is like the rock at Dundas
Falls. Below this stone there is

about 4' of rock with *T. carinatus*,
S. pinnatus, *Cystodonta*, *S. rotunda*,
Platyceras sp., *T. carinatus*,
S. arctostriatus, *Pal. concentrica*, *P. rana*

At 27 very soft shales of dark color
 have - *L. laevis*, *S. tullyi*, *A. praeu-*
ona, *R. lida*, *S. pinnatus*. The *S. tullyi*
 at this level are all of small size.
 This is the same sequence as seen
 at Timbers Falls. The hard band
 below with *Emella* and *Echinoceras*
 must belong to the first rock
 that I noted at Timbers.

At 28 in rather dark shales
 having a few concretions the
 following fossils were seen

Pholidops hamiltoniae

N. varicosa

Pal. concentrica

R. vanuxemi

T. carinatus

Lingula sp.

M. pygmaea

Lox. hamiltoniae

N. bellistriata

R. spiniferoides

S. pinnatus

C. undata

N. lirata

These are probably representative
 of Clarendon's uppermost transition
 zone.

28-29 - a small exposure in the
 middle of this interval yielded
P. rana, *L. lirata*, & *Pholidops*

29-34 - *lirata*

1' above 34 is a hard ls. band
 6" thick forming a cascade. It
 contains:

C. scitulus, *J. carinatus* cc., *S. macginitii*,
striata, *C. mucronatus*, *S. perversa*,
Superplana, *S. pinnatus*, *P. rana*

Below this ls. there are 3' of coarse sparsely fossiliferous shale.
S. pinnatus, *Orinoides*, *C. scitulus*

On the ls. come gitty blue grey shales with *S. pinnatus* cc., *Cystodictya*, *J. carinatus*, *P. nodocostata*, *C. scitulus*, *N. oblongatus*, *N. triquetus*, *O. parvula*, *N. bellistriata*. The shale is rather hard.

About 2' below 35th step come much softer shale. The hard calcareous zone is about a foot thick including the shaly beds noted in the paragraph above.

On the shales on this calcareous band are:-

J. carinatus

S. pinnatus

C. bellistriata

The shales are sandy, thin bedded with shale partings between.

These sandy shales end at about 35 steps. Between 36 + 37 a small exposure of very dark argillaceous soft shales have *L. linna* in abundance. Also specimens of *C. scitulus*. The shales are black, in places rusted to a red brown as noted in the black shales at Tinkers.

37-38 - diatoms

38-39 - more black shales with *N. oblongatus*. The shales are rather hard here. *J. carinatus*, *N. corbuliformis*, *C. scitulus*, *P. emarginata*, *N. bellistriata*,

J. submarginata,

At the top of 39 *S. tuberosus* is common in large fossils. Also *Leptæna*, *T. carinata*, *G. capillaria*, *M. pyramida*, *A. unguiculata*, *P. patulus*, *C. bellistriata*, *P. discoides*.

39-40 - Lighter blue grey shales than those below with

<i>S. pennatus</i>	<i>P. rana</i>
<i>M. concentrica</i>	<i>P. wagneri</i>
<i>P. fimbriata</i>	<i>S. submarginatus</i>
<i>S. sinuostriata</i>	<i>Trigula</i> sp.
<i>V. pustulosa</i>	<i>Pal. concentrica</i>
Small <i>Taormus</i> .	<i>H. dekeyi</i>

40-42 hiatus

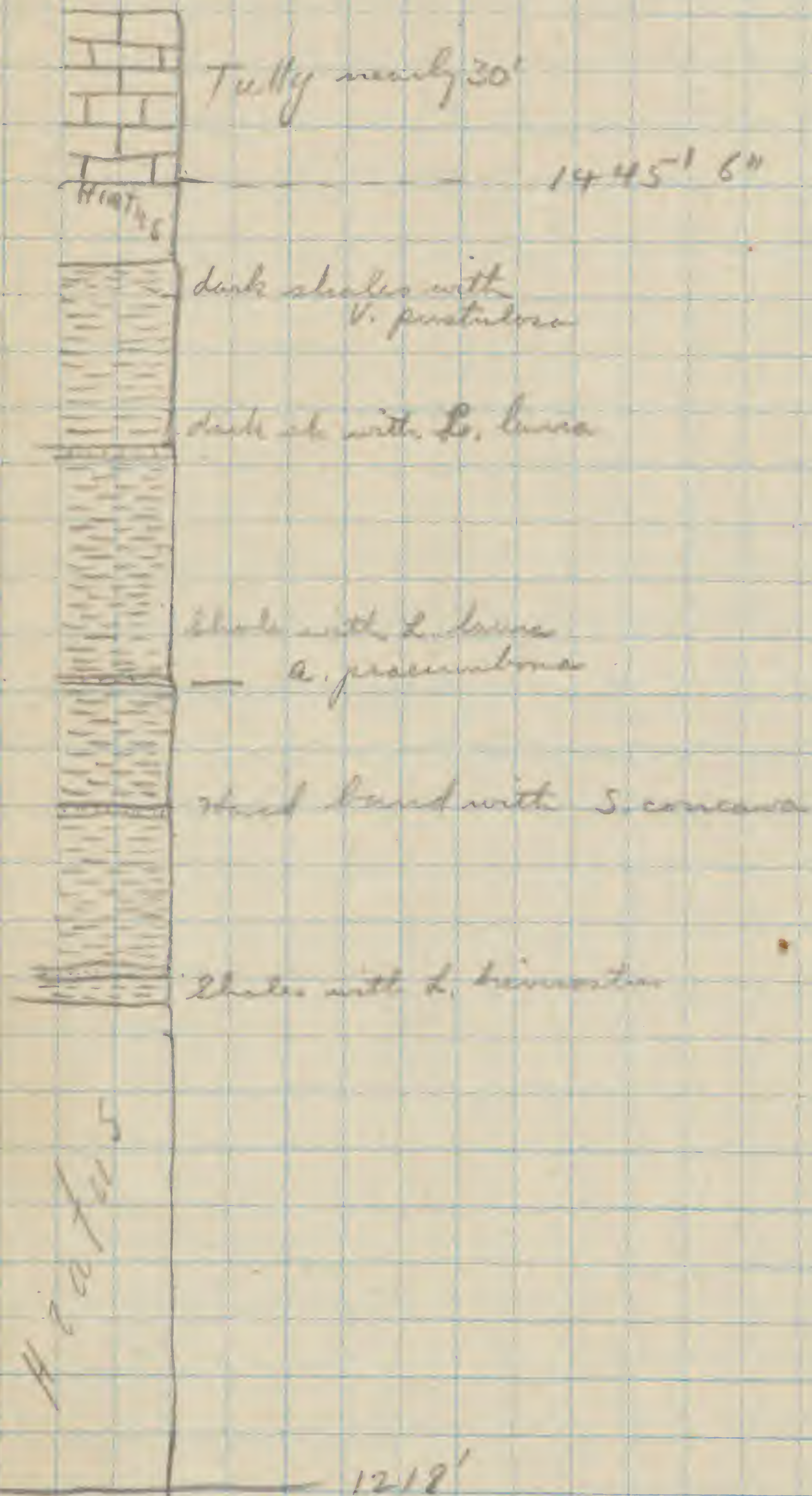
At 42 Tully ls. - contact with Moscow not seen. The contact with Genesee was not seen, but is near 30' above the base of the Tully. The Tully is here at about 445' above tide. The lower beds of the Tully are quite shaly.

There is considerable pyrite in the shales above the bed at 34.

210
18
228
30
258

1215
212
1003

Karvine at Keeney



Clarke's Ravine - north of Keeney

In a ravine a short distance south at 214 paces was found a hard micaceous, calcareous band but it did not yield fossils as it was poorly exposed. At 320 paces about 10' of shales are exposed. These are grey in the interior & blue-grey on the surface of the dip into which it breaks rather readily. Fossils are: -

A. umbonata

P. plana

C. lepidus

C. scitulus

C. boothii

S. perinatus

P. plana

A. spiriferoides

G. capillaria

Trigula sp

N. trigueter

C. coronatus

From 429 paces to 435 paces same as above in stream bed

at 500 paces same as above.

at 555 the ravine branches, & shows rock at the fork: -

C. beelishulata

I. carinatus

About 10' above this ~~step~~ place (555) *A. umbonata* is very abundant but above this the SE branch is covered with debris and obscures all rock.

15' above the 555 place are dark rocks.

About 40' above 555 is a hard band containing *M. concentrica*

Clarke's Ravine north of Keeney

Sept. 5.

Handlevelling begun at 1215'

Between 6 & 7 steps up comes about 9" of hard sandy shale grey-blue in color and calcareous. It has an undulating fracture. Fossils:-

C. scitulus c

A. spiniferoides

S. perversus

R. vanuxemi

1400

C. bellistriata

M. bellistriata

1400
1400
1400

At 11 steps comes blue grey rather fine shale with *B. umbonata* (see fossil list on previous page).

At 14 these blue grey shales are exposed in the stream bed.

Below the stream divide and here there is a good exposure of blue grey shales. These contain between 20 & 22/-

A. umbonata c

C. boethi

Pal. marginata

I. caninus

S. perversus

P. rana

Pal. concentrica

C. bellistriata

C. marginatus

A. reticularis

M. bellistriata

M. costuliformis

M. oblongatus

S. arctostriatus

M. triangularis

Lox. hamiltoni

C. scitulus

O. carinata

M. pygmaea

Por. hamiltoni

Trig. pinnata

O. parvula

Trig. pinnata

At 25 comes a fall and this has up to 25 *A. umbonata*.

At 25-26 come

A. finlayi

S. perversus

C. scitulus

A. spiniferoides

C. induta

M. concentrica

R. vanuxemi

S. perversus

E. buckhami

26-27 - *R. fimbriata*, *J. carinata*,
S. balthica, *S. carinata*, *C. undata*,
P. humifusa, *C. scutellus*,
A. umbonata, *M. oviformis*,

A foot below 27 there is a hard
sandy shale band with many
fossils:-

<i>R. variegata</i> c	<i>S. perversa</i> c
<i>J. carinata</i> c	<i>A. spiriferoides</i>
<i>C. reticularis</i> c	<i>S. laudaculus</i>
Small black conchoidal	<i>S. granulosa</i>
<i>S. inaequistrata</i>	<i>Pal. concentrica</i>
<i>P. oviformis</i>	<i>S. cheamensis</i>
<i>Oriskany</i>	<i>S. concava</i> ?
	<i>S. perplana</i>

These beds + those below strongly
resemble similar layers in the
part of the series at Georgetown.
These beds at 27 probably
represent Cleaveland. The phos-
phatic zone as the presence of
Rhipidomella is striking.

27-28 - shales are softer and have
few fossils.

28-29. In the middle of this interval
the shales are coarser and produce
a cascade. The hard band has
S. communis?, *C. coronata*,
C. reticularis, *C. bellistata*,
S. inaequistrata, *M. concentrica*,
Jagoriana, *Oriskany*.
This band is about $\frac{1}{2}$ thick.

29-30 - soft dark blue-grey, gritty
shales with
P. radiata
O. parvula
S. capillaria
T. submarginata
A. umbonata
Pal. concentrica
Pal. concentrica
S. carinata
M. bellistriata
M. varicosa
L. brevisostis
S. crataegum

30-31 -

M. corbulariformis
Palaeosolen
M. capillaria
Gracilomya sp.
T. carinata
C. scutellus
T. carinata
Ostrea sp.
B. leda
M. oblongatus
C. bellistriata
M. trigonatus

31-32 - At the top of 32 there is a
hard band. The shale at top of 31 has
a very peculiar uneven fracture.
The rock at the top of 32 is a hard
arenaceous blue grey stone. It gave
no appearances.

32-33 - hard arenaceous shales with
some ls. accumulations in the form
of lenses. Fossils are: *Spermatites*,
M. concentrica, *C. mucronatus*.

The top of 32 is a hard sandy rock
with abundance of *Taonurus*.

T. carinata
C. mucronatus

33-34 - most coarse shales.

35-37 brachioles.

About the last 2' of 37-38 are dark grey shale weathering to a light grey. These are slightly grittier and softer than those below.

S. pinnatus cc

C. scitulus

E. punctata

Platysurus sp.

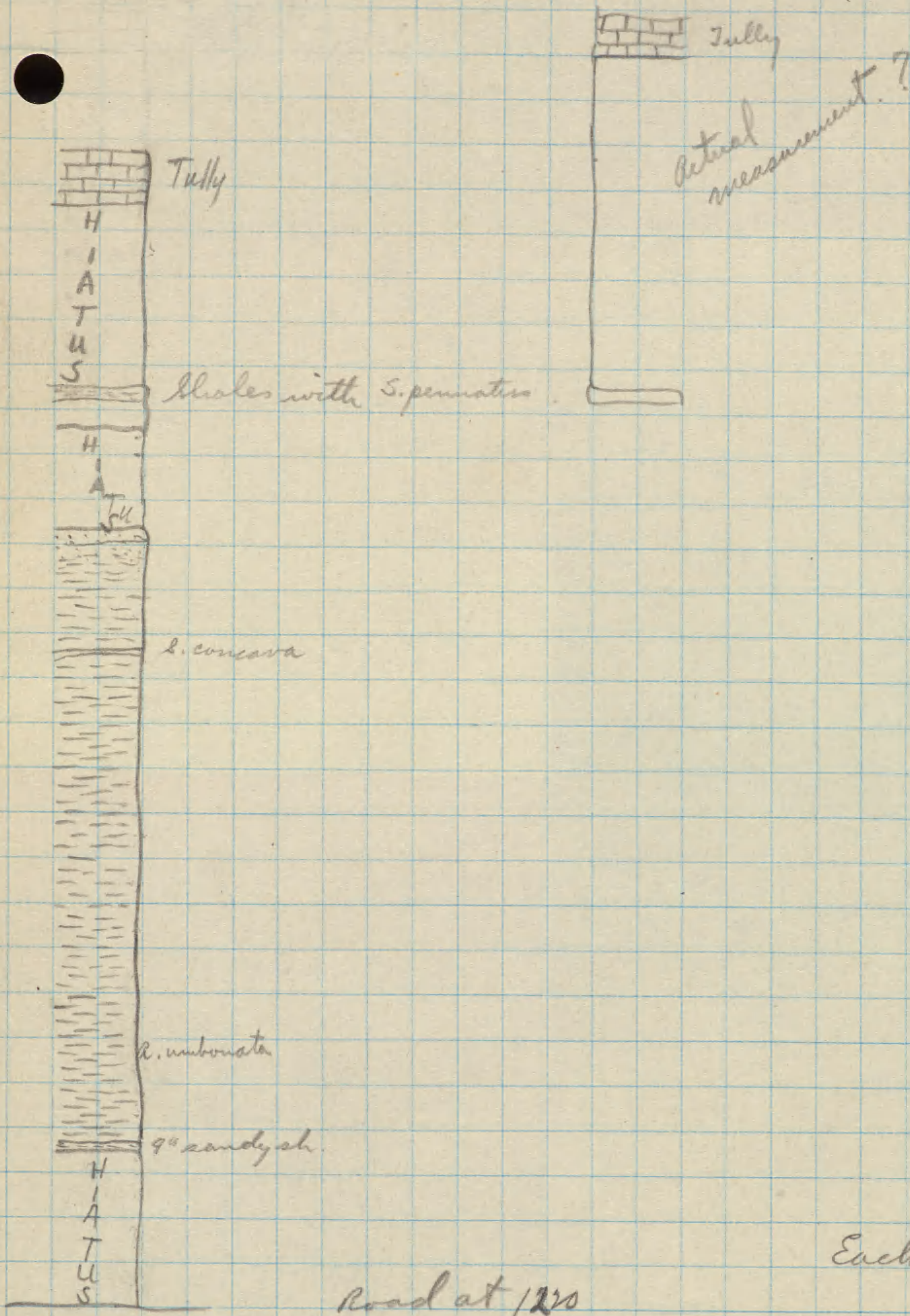
Prodictella sp.

The *S. pinnatus* are very long winged

~~38-52~~ 38-52 brachioles and at the top of 52 comes the Tully, the lower layer of which is about 2 1/2' - 3' thick.

The Tully is at about 1502' A.T. The same divides at the base of the Tully.

These figures above on the Tully are probably wrong; it should be somewhere about 1450'. I must have made a mistake in the hand-levelling. The levelling was carried up to 38 O.K. but was lost here. At least 7 steps exist up to the Tully but probably more also. The elevation of the Tully must be around 1467-1482.



June 15 (7)

O'Dell's Quarry

Quarry 25' high N 17 E of Erieville.
This quarry shows a section similar
to that at J 15⁽⁶⁾ but is higher up.
At the base is a hard grey arenaceous
shale, becoming softer & bluer for
a short interval (2'-3') then hard
again. This interval contains *S. pennatus*,
C. coronatus, *C. scitulus*, *C. mucronatus*,
T. carinatus.

6' above base is a calcareous band
(lens) with many *Chonetes* and
S. pennatus.

The arenaceous shales are hard
and massive up to 12' above the
base. Where there is again a
shell ls. band about 4" thick.
This band contains large *Strophodontes*.

The shale above the ls. band
is softer and contains many fossils.

<i>Crinitaria elongata</i>	<i>M. concentrica</i>
<i>S. pennatus</i>	<i>C. bellistriata</i>
<i>T. carinatus</i>	<i>M. mytiloides</i>
<i>R. cycloides</i>	<i>C. bothri</i>
<i>S. parviflora</i>	<i>B. leda</i>
<i>P. flabellum</i>	<i>C. coronatus</i>
<i>S. granulosus</i>	<i>N. bellistriata</i>
<i>P. discoidium</i>	<i>P. concentrica</i>
<i>O. carinata</i>	<i>S. solenoides</i>
<i>D. hamiltonensis</i>	

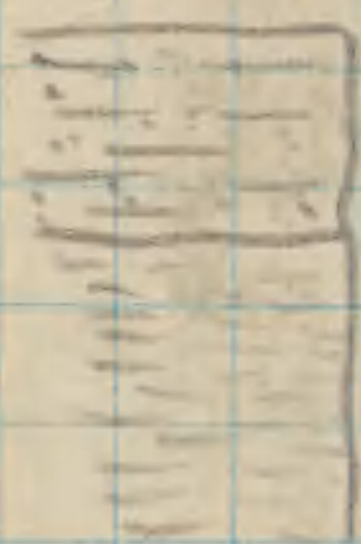
Incised-like growths were noted in
the lower rock, called by O'Dell a blue
lime.

225 1927 225
Road nr. Sheds
Sept. 6.

Between 257 & 26 paces up road were found shales and coarse sandy shale, which in the lower portion for about 2 1/2' is a soft olive colored shale because of weathering. This soft shale contains

<i>G. constricta</i>	<i>T. submarginata</i>
<i>Leda sp. (cf. diversa)</i>	<i>C. bothi</i>
<i>S. pennatus</i>	<i>N. triquetra</i>
<i>O. caninata</i>	<i>M. pygmaea</i>
<i>Pal. concentrica</i>	<i>C. setulus</i>
<i>P. rana</i>	<i>N. oblongatus</i>

Small pitted pyrite concretions



sandy sh 1 1/2'

soft gutty olive sh.

On the soft shales comes rather abruptly coarser shales breaking into thick irregular slabs. This horizon contains

<i>I. cuneatus</i>	<i>S. granulosa</i>
<i>N. liata</i>	<i>Crinoida</i>
<i>Pal. concentrica</i>	<i>Orthoceras</i>
<i>G. obsoleta</i>	<i>R. canaliculata</i>

Each square 1'

C. coronatus

Some of this stone where fresh is blue grey and appears argillaceous. It weathers to a brown sandy rock

<i>S. perplana</i>	<i>C. microstoma</i>
<i>H. debyi</i>	<i>P. spinulicosta</i>
<i>A. erectum</i>	<i>B. fofoa</i>
<i>Par. hamiltoniae</i>	<i>P. discoida</i>
<i>N. bellistriata</i>	<i>P. discoidum</i>
<i>P. emarginata</i>	

Cambratwechia cf. *appla*

Top of hard band is at 26.

26-27 Blue grey gritty shales like those at Edinville breaking into large fragments

27-28 - Same with *S. perplana*, *S. circularis*, *T. carinatus*, *R. vanuxemi*, *C. mucronatus*

at 28 is a thin sandstone band.

28-29 - *Sperplana* cc, *R. vanuxemi*, *T. carinatus*, *S. granulosa*, *Aulopora*, *P. discoides*, *C. boothii*, *C. tenuistriata*, *S. pennatus* a foot below 29.

At 29 the rock is harder and appears calcareous. Here fossils are very numerous: - *C. mucronatus* cc, *T. carinatus*, *R. vanuxemi*, *S. pennatus*,

29-30 - *S. granulosa*, *P. patulus*, *R. vanuxemi*. In the middle of this interval the rocks are hard and calcareous.

30-31 - On top of the somewhat calcareous rocks between 29 and 30 are found blue grey fossiliferous shales that contain

A. decussata

S. perplana

C. mucronatus

M. triquetra

P. rana c

R. vanuxemi

S. pennatus

M. pygmaea

Pal. concentrica

Pac. hamiltoniae

Lox. hams.

Lepteria sp.

A. serpens

P. emarginata

A. umbonata

C. indenta

C. boothii

M. mytiloides

C. bellistriata

M. oblongatus

Spirifer

P. nuda

S. crotalum

This layer seems to have a more varied fauna than those below.

P. radiata *S. rugosa* *Orbiculoidea* sp.
A. reticularis *Pholidops* hem.
P. lanceolata *S. arcuata*
C. sappho *S. carinata*
Disarticulated *P. rana* are very common

30-32 — *P. oviformis* *S. chenuvengensis*
Cystodictya
O. carinata
C. corrugata
R. fimbriata

Above 31, about 12' of these shales are exposed.

Between 33 + 34 —

Same shales with *J. carinatus*
S. pinnatus, *R. fimbriata*, *E. lincklaeni*
S. granulatus, *A. reticularis*. These shales also exist about 10' above step 34. in a small bank exposure. They seem less fossiliferous. *S. crotatum*
C. mucronatus, *J. carinatus*, *M. pygmaea*
Oothoceras sp., *Lophonema* sp., *N. varicosa*
N. bellistriata

Between 35 + 38 — hiatus

At 38 a small exposure of the same rocks with abundance of *S. pinnatus* was seen.

From 1635' 170" to 1645' 180" - in a side
branch going east - *liatus*
1645' 180" - 1650' 185" - soft blue grey
gritty shales, *M. triquetra*, *P. rana*,
S. cristatum, *S. granulatus*, *S. pinnatus*,
M. mytiloides, *A. spiriferoides*,
M. concentrica,

1650' 185" - 1655' 190" - *S. pinnatus*,
J. carinatus

Sept. 6.

West of Eagleville on top of Hill west of
Eaton - Morrisville road - sandstones,
slabby, rather coarse, with concretion
pockets. *P. flabellum*, *J. carinatus*, *Camartoechia*
These probably belong to the Fertileland
Stock Farm horizon

Sept 28.

Road to Linselor Hill

Handlevelling begun at 1570' A.T. at
R.R. track at Erieville Station.

1570' — 1600' 30" — hiatus. At 1600' 30"
coarse arenaceous shales with
P. variegatus, *P. flabellum*, *P. lanceolatus*,
S. pennatus, *A. spiriferoides*, *T. carinatus*,
T. carinatus. 2' exposed — hard

1600' 30" — 1605' 35" — hiatus

1605' 35" — 1610' 40" — coarse arenaceous
shales with *T. carinatus* + *S. pennatus*.

1610' 40" — 1625' 55" — hiatus

1625' 55" — 1630' 60" — 2' of softish
blue green shales in the middle of the
interval. *S. pennatus*, *T. carinatus*,
At the top of this interval are hard
arenaceous shales with
S. pennatus *A. large Strophodont*
T. carinatus *C. bellistriata*
C. scitulus

1630' 60" — 1635' 65" — same *S.*
pennatus, *S. andalus*

The arenaceous shales here
weather to a purple exterior.

These exposures were much too
covered & patchy to be worth
anything.

Sept. 20.

20' below the top of Inselor Hill small exposures of upper Moscow shale with *S. tullius* c, *T. carinatus* c, *M. oblongatus* Pal. *constriata*, *S. capillaria*, *Trochilina* sp.

At the top of the hill on the south side of the hill, loose slabs of ls. about 3" thick can be found which carry small cup coral, *Ambocoelids*? and abundance of *P. rana*. It is at about 1205 A.T. Moscow was seen up to 18' of the top. The slabs are probably ~~put~~ in place but still cannot be far out of place. They suggest a thinned Tully. The ls. is light blue grey and inclining to cherty thick slabs, somewhat like the Corniferous but it is lighter. This cannot be the bottom bed as that is granular.

On the next hill east at about 1290' are found Moscow shales much weathered and fragmented. Slabs are noted and "varnished". Fossils are abundant notably *L. longa*. Others are *Grammysia* cf. *ciccolini*, *P. marginata*, *Cypicodonta* sp. *T. carinatus*. The upper 2' of the exposure are light grey with red shales below. *Boysenella* & *Boysenella* like those below. The contact is weathering is striking. The upper bed does not have *L. longa*. Along the road shales with *L. longa* were seen near the top of the hill east of Inselor Hill. The exposures are with a gap of 100' that the only fossils are in Inselor Hill.

Genesee near Sheds: - 1750' A.T. Tully
slabs nearby it, indicates its closeness

Tully ls. 1648

Near head of Otselee Creek. The ls. is
found at the foot of the ravine with a
few inches of Muscov below. The thickness
is 16' 3" with a foot of ls. that is
transitional between the Tully & the
Genesee. The bed contains about 15
layers, the bottom one of which is
the thickest about 1 1/2". About 3' from
the top a very fossiliferous bed was
seen, the same as that in the
other Tully localities. There are also
shale bands, particularly above &
below the fossiliferous (Platyceras) band
noted.

The Genesee extends for at least
50' above the Tully. At about 57' above
the Tully a thick ss band comes in
and below it about a foot of thin
ss. This probably marks the end
of the Genesee, for all the shale
noted above, to about 98' above
the Tully was not black but rather
olive. This shale was interbedded
with thick layers of ss. Sometimes
the ss layers were divided by
intercalated beds of thin ss.

Tully 16' 3" The Tully is at 1648' A.T.

Genesee - 57' + 1' transition ls.

Sherburne - 7'

Many ss. slabs in the stream bed
have a curved plane.

232

232

Muller Hill

cl. thaca ?

53' below house on top of hill 13' of rock
grey ss & shaley ss. with a few fossils
exposed in the road where it has been
quarried. Wood was not uncommon.
The rock breaks up into small pieces.

27
27
27
27
27

69
69
69
69
69

Sept 8.

Stockham Hill

2 Gullies unite 4.8' above top of Pompey.

Hand levelling begun from the top of the Pompey. The top bed of the Pompey has, *Marguta*, *L. pappiana*, *P. flabellum*, *Athyris*, etc. The ravine was not followed to its mouth as the Randallville was the big problem here. However, practically all of the Pompey is exposed but rather poorly.

Top of Pompey — 65' — covered

65' — 70' 5" — thin sandy shale and thin ss of the Randallville

70' 5" — 95' 30" — same

95' 30" — 115' 50" — mostly a dark gray shale that splits into very flat ~~shale~~ chips, irregular squarish jointing. Fossils are very rare.

P. fragilis

115' 50" — 135' 70" — mostly the same as the top

135' 70" — 145' 80" — shale coarser, *L. laura* a

145' 80" — 170' 105" — best exposure and bridge. The Randallville is thus at least 179' thick. The top of the Pompey must be at 1151' A.T.

Bridge at 1330'

Section West of bridge

0' — 5' 5" — covered

5' 5" — 10' 10" — Grey, weathered sandy shale with some interbedded thin ss. Fossils are as follows:—

*S. antiostrata**L. pappiana**M. arguta* c*P. emarginata**C. indenta**S. pennatus**Athyris**P. laeta**A. fasciculatus**C. congregata* c*P. planus**Cyrtina laura* c*P. spinulicosta**H. delany**C. boothi**C. mucronatus**L. laura* c

There is about 9' of this shale exposed above the bridge, the top being about 18' above the level of the bridge.

Fossils in shale above 18'—

A. granulosa

T. carinatus

R. vancouveri

S. hamiltonensis

C. las scitulus

P. rana

S. sculptilis

S. pennatus small corals

L. rogersi

Schiz. cheungensis

A. spiniferoides

A. reticularis

P. coronata

D. maquistriata

About 63' above the bridge comes a hard sandy layer about 6' thick forming a fall. This contains:—

S. pennatus c

L. perplana c

A. spiniferoides

Cyrt. ham.

M. concinna

A. granulosa c

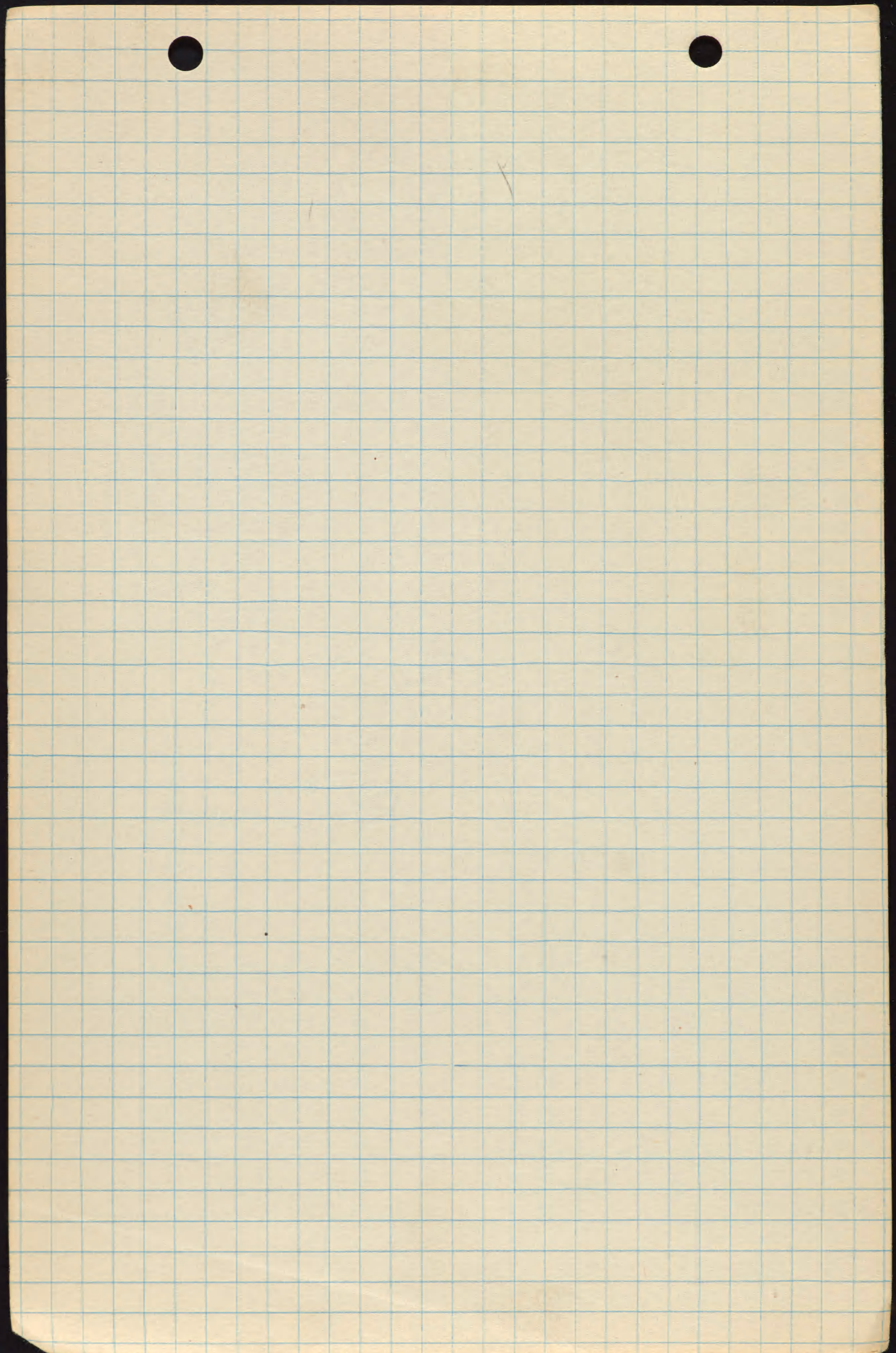
S. perverea

C. coronatus

A. reticularis (large)

A thin layer of crinoidal stone occurs about

1' below the beds carrying *S. sculptilis* but above it is about 1' sandstone. I believe the Ludlowville-Shinarump contact is at about 1348' above sea-level



Cay Quad.

Sept 8.

Exposures on Roadside

Hand levelling begun at 1015' AT.

1015' - 1035' 20" - covered - at the top is about 2' of ~~arenaceous shale~~ ~~arenaceous shale~~

arenaceous rocks abounding in *A. boydi*.
 2' above the top of this interval comes a
 bed of corals, mostly ^{3-4 ft} *Zaphrentis*, in the
 sandy shale. This is probably at the
 same horizon as the corals at Delphi.
 These are in the Delphi member.

1035' 20" - 1040' 25" - 1045' 30" - Fossils in the
 arenaceous sh. -

<i>A. boydi</i> a	<i>C. mucronatus</i>
<i>P. liata</i>	<i>P. flabellum</i>
<i>M. subulata</i>	<i>S. crotalum</i>
<i>A. spiniferida</i>	<i>P. spinulicosta</i> c
<i>M. mytiloide</i> , c	<i>B. sulcomarginata</i>
<i>A. princeps</i>	<i>L. macroptera</i>
<i>M. alta</i>	<i>L. pimplina</i>
<i>N. arguta</i>	<i>A. glandosa</i>
<i>T. annulus</i>	<i>M. concentrica</i>
<i>L. obsoleta</i>	<i>O. loxia</i>
<i>C. recurva</i>	

$$\begin{array}{r} 1548 \\ 1157 \\ \hline 191 \end{array}$$

$$\begin{array}{r} 34 \\ 1548 \\ 1157 \\ \hline \end{array}$$

Erieville

June 18th

The first appearance of bed rock in stream is at about 1530'. The first rock encountered is a blue shale on exposure but quite block when fractured.

✓ *P. plana*
 ✓ *I. submarginata* c
 ✓ *N. biata*
 ✓ *O. parvula*
C. brachi
Camptoechia sp.
Bryozoa
Homalotremis
Spinifer sp. c.
 ✓ *S. pennatus*
 ✓ *C. scitulus* cc.
Luigula sp.
 ✓ *G. bisulcata*
 ✓ *H. arcuata*
 ✓ *S. channingensis*
G. capillaria

✓ *N. bellistriata*

Ostracod

✓ *A. umbonata* 1540'✓ *N. oblongatus*✓ *N. triquetra*Foss. *Homalotremis*✓ *Craniella* lam.✓ *O. carinata*✓ *O. undulata*✓ *P. concentrica*✓ *A. erectum*✓ *P. tenuistriata* ?✓ *M. concentrica**P. flabellum* (small)*A. cf. princeps*

This fauna may place these shales at about the same horizon as the blue shales at the Erieville railroad cut. At 1540' about 6' vertically of the bluish shales are exposed.

At 1537' hard sandstone is encountered that breaks into blocks & joints here trend N32E. The blocky ss. is only temporary in the sequence for about 2' above it there are hard shales one surface of which is distinctly ripple-marked. These hard shales break into flat-slabs. A complete *Homalotremis delongi* was found at about 1539'. A few *Camptoechia* & plants

18' 16'	1677	Blue shales	
	1659	with abundant fossils	1678 30 1648
	1643	soft sandy sh.	16'
	1626 1/2	shales with S. pennatus & L. laura	52'
	1625	hard sandstone	
		Blue shales with S. pennatus and L. laura	62'
	1590	soft sh. with L. laura	
	1584	hard sandstone	
	1582	hard sandstone	
	1580	hard sandstone	
	1577	same as at 1567-1574	
	1567	hard sandy sh. with ripple	7'
		limestones	22
	1545	Blue shale upper layers	15'
	1530	very fossiliferous	

Stems were also found at this horizon

At 1582' occur a few inches 6-9 of soft shale with many fossils

L. laura

Strophodonts cf. denissa

L. pennatus

Camarotoechia sp.

C. mucronatus

Orthoceras cf. bebyx?

Rhipidomella vanuxemi

Spirifer sp.

On this layer of soft shale is a $1\frac{1}{2}$ -2' band of hard resistant sandstone which is capped by about 6' of soft shale with

L. laura cc.

C. elongata

Strophodonts cf. denissa

Grammysia sp.

P. emarginata

M. concinna?

M. trigonatus

Camarotoechia sp.

I. submarginata

~~*G. globosa*~~

These shales are like the thin band below. At 1591' these shales are less fossiliferous but contain

Camarotoechia sp. Excellent ripple marks were noted at 1592' On

cross-section they would appear with a steep slope ^{to west} on ~~one~~ side, that to the

as they trend N 74 W. They measure about 3" from crest-to-crest. The troughs

are shallow. Joints here are N 16 E and about $2\frac{1}{4}$ ' apart. At 1595' *M. oblongatus*

was noted. *L. laura* at 1597' at 1602

L. pennatus, *Camarotoechia*, *M. concinna*

Between 1602 & 1607 the shales are quite fossiliferous with

L. pennatus cc.

Amalopacten

A. umbonata

Grammysia sp.

M. concinna?

M. mytiloides

L. laura *S. perplana*
 At ~~1607~~¹⁶¹³' the same kind of shales
 are still present

At 1618' were found *N. triquetra*, a
 large *Cammarotoechia*, *C. congregata*,

At 1625' is a 1' band of hard blue
 sandstone that makes a cascade
 in the stream.

From 1625' - 1636' on top of the ss band
 are blue shales with *L. laura* & *S.*
pernatus.

1643 same, but appear harder,
 here they have been sunbaked & are
 grey

In the interval between 1643 and 1654'
 the rock has become hard and sandy,
 forming a sandstone. This ss has
 large p. perfrs, probably granular,
 and occasionally a large round
 concretion

At about 1660' blue shale again
 with *S. pernatus*, *Strophodontas*, *S.*
carinatus, *S. granulosus*, *N. concinnus*,
A. spiniferoides, *P. concentrica*,

S. pernatus is abundant at 1664.
 1664-1669' - *N. oblongatus*, *S. pernatus*,
P. radiata, *S. carinatus*, *C. boottii*,
S. perplana, *O. undulata*.

The shales at this level resemble
 very closely those at Georgetown in
 the brook where I have collected
 many specimens.

Sept. 30

Having near Euclid

Hand-belling begins at about 1530' AT.

First rock seen comes at 1570' AT.

1570' 10" — 1575' 15" — Blue gray shale

✓ *A. umbonata*

✓ *P. linearis*

✓ *M. subulata*

✓ *P. submarginata*

Constricta sp.

Loxoneura sp.

1575' 15" — 1580' 30" — same

At the top the following were seen.

Loxoneura sp.

L. linearis

✓ *P. linearis*

P. flabellum

✓ *M. linearis*

✓ *M. varicosa*

C. boethi

✓ *O. undulata*

1580' 20" — 1585' 25" — shales — blue gray

concretions, like those at Euclid.

✓ *A. constricta*

✓ *A. undulata*

✓ *S. pinnatus*

✓ *M. triquetra*

✓ *Pal. papyra*

Fossils are not very abundant but the variety is large.

1585' 25" — 1595' 35" — limestones

1595' 35" — At top of this step shaly

sandstones for about 3'.

1595' 35" — 1600' 40" — ss with

Constricta. A *S. linearis*?

The stone here is rather strongly ripple-marked in one place. Where weathered the sandstone breaks up into rather thin irregular slabs.

1600' 40" - 1605' 45" - about 2' of ss. that breaks into irregular slabs and almost devoid of fossils. The only fossils noted here were small *Campanotrochias*.

1605' 45" - 1610' 50" - fine ss & sandy shales

1610' 50" - 1615' 55" - *P. emarginatus*, *P. flabellum*, *P. varicosus*, *C. mucronatus*, *P. maxima*, *P. terminata*, *S. circularis*, *L. laura*, *Spirifers*. About 1' above this layer there is a 6" hard layer of ss. and above this 3' of blue grey arenaceous shales, with:-

S. demissa
A. spiriferoides
P. flabellum ~
S. pentalina
P. constricta

A. princeps
Crin. laura
N. oblongatus
N. trigleter
L. laura

1615' 55" - 1620' 60" - same sandy blue-grey shales capped with harder ripple-marked sandy shales. The only fossil found in this upper block was *A. terminata* & a *Campanotrochia*.

1620'60" - 1625'65" - soft blue
gray sh. like the Euville sh.
with *C. boothi*, *A. superius*,
A. squamula and *P. constricta*, these
shales are so poorly exposed
that collecting is almost
impossible.

1625'65" - 1630'70" - same only
seen in bank.

1630'70" - 1635'75" - same shale

<i>S. penatus</i>	<i>Camerozoechia</i> sp.
<i>C. boothi</i>	<i>P. emarginata</i>
<i>L. perplana</i>	<i>A. spiniferoides</i>
<i>H. oblongatus</i>	Crab bones.
<i>H. corindum</i>	

1635'75" - 1640'80" - same sh.

<i>S. penatus</i> cc	<i>L. larva</i>
<i>Camerozoechia</i>	<i>A. spiniferoides</i>

1640'80" - 1645'85" - same shale
Coarse-ribbed *Camerozoechia*

<i>S. penatus</i> cc.	<i>Ammonoidea</i>
<i>P. bellum</i>	<i>G. bisulcata</i>
<i>C. bellistriata</i>	

1645'85" - 1650'90" - large *Camerozoechia*
Orthoceras sp., *Tranumia obsoleta*
in blue-gray sandy sh. *S. penatus* c
a foot below the top of this
interval is a 9" bed of sand
as.

1650'90" - 1655'95" - blue-gray sandy sh.

1655' 95" — 1660' 100" — shales becoming
coarser

1660' 100" — 1665' 105" — very arenaceous
sh or fine ss.

1665' 105" — 1675' 115" — mostly slabby
ss or very coarse sandy sh.
continuing up to 1678' 115" then becomes
shaler & finally becomes a rather
soft blue gray sh.

The soft shale goes up for
S. pennatus, *T. carinatus*

Ravine near Road, between
Sheds + New Woodstock. 1445

About 1455-1465 - Rather soft somewhat, gritty
shales in the stream bed. They are blue grey
to olive according to the degree of
weathering

S. fissurella
S. pennatus
C. scitulus c
N. oblongatus
C. bellistriata

P. radiata
T. bellulus
O. undulata
T. carinatus

The *S. pennatus* are very large, numerous
and relatively long. The *T. carinatus* is
transverse

At about 1463 the rock is a hard
sandy shale that breaks in the top
bed into large, thick slabs.

Fossils here are

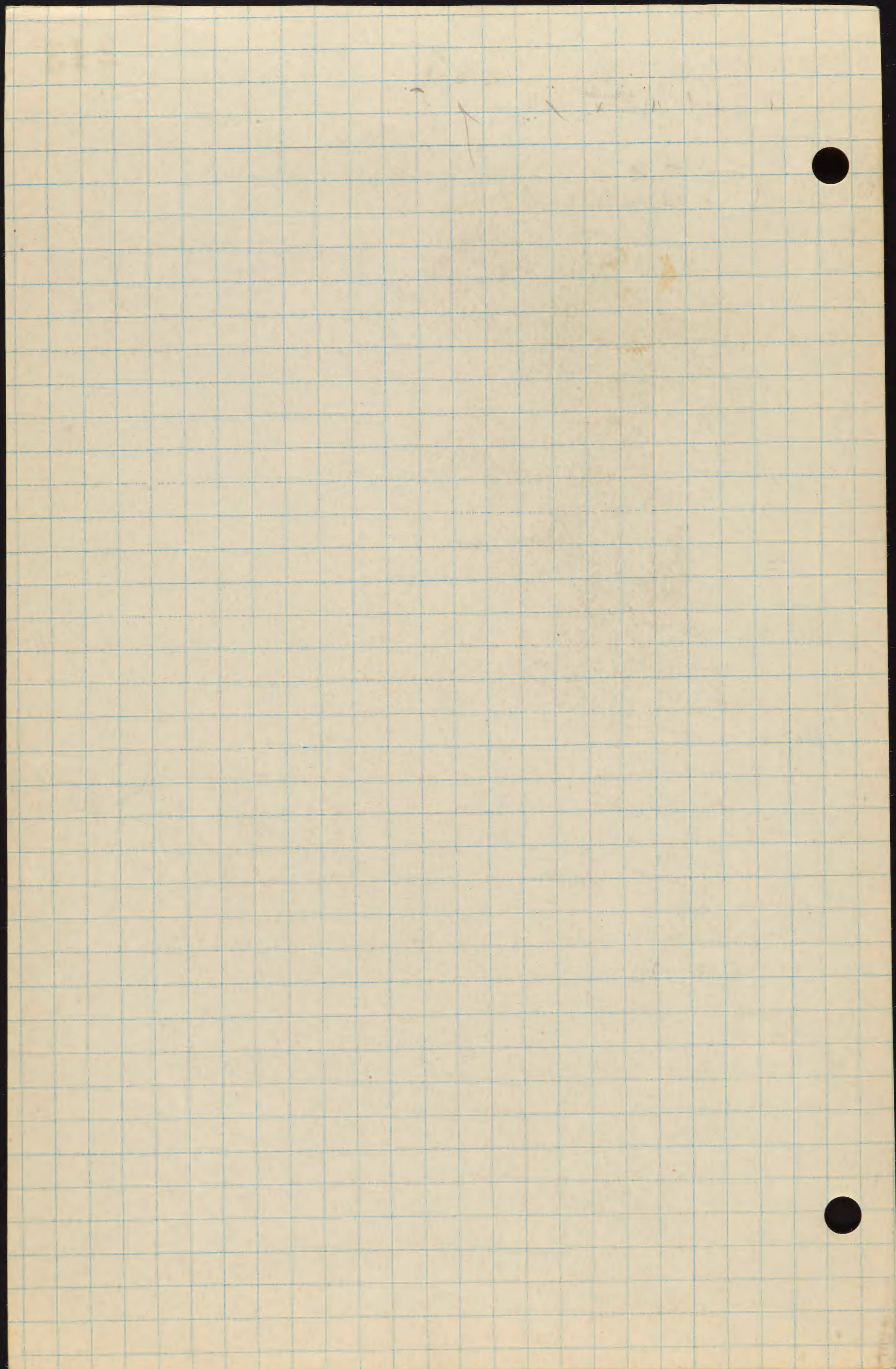
L. aspidium
S. lirata
A. princeps
N. bellistriata
D. acunata

T. carinatus
S. pennatus
C. scitulus
S. perveissu
N. lirata

The rocks on the surface are brown but
dark blue grey within.

1465'5" - 1470'5" *T. carinatus*, *P. varruensis* c
S. granulosa, *S. pennatus*, *C. bellistriata* c
P. spinulicosta, *Cystodictya*, *Fenestellids*
in a sandy shale rock.

2' above 1470'5" - comp the top of
of a 2' layer of rock like that below
with *T. carinatus* a, *Cyrtolites*, The top
is capped by a calcareous rock
with the same fossils. and



C. bellistriata, *P. rana*, *P. emarginata*

1470'5" - 1475'10" - Softer dark-blue grey shales abounding in *S. pennatus*^a, *B. lella*, *G. carinata*, *A. erectum*, *J. carinatus*, *c.*, *Pterinogaster* sp., *G. bisulcata*, *H. corbulariformis*, *Pholadella parallelus*? *Lingula* sp., *P. radiata*. These shales are softer and break into small chips.

1475'10" - 1480'15" - hiatus

1480'15" - 1485'20" - Very soft dark ^{blue grey} shales gritty with: - *P. radiata*, *S. pennatus* a, *Goniophora* sp., *Grammysia* sp.,

1485'20" - 1490'25" - The shales here have weathered to very small chips: - *C. mucronatus* a, *C. scitulus*, *S. pennatus*, *M. pygmaea*,

These shales by the time 1490'25 is reached have become rather argillaceous the grit having quite disappeared.

Collecting is difficult here as the shales break into very small fragments -

S. perplana small, *P. emarginata*, *C. boothi*, *P. rana*, *S. granulosa*, *H. bellistriata*, *Lox. lam.*, *H. lirata*, *S. pennatus*, *C. scitulus*, *A. umbonata*, *C. tenuicinctus*, *C. coronatus*, *P. radiata*, *H. triquetra*, *Cranc. hamiltoniae*, *S. minutum*, *Pal. concentrica*,

1490'25" - 1495'30" - *H. debayi*, *C. boothi* var *callitales*, *C. mucronatus*, Occasional small calcareous oval concretions *A. umbonata* c, *C. scitulus* c, *C. bellistriata*, *H. capillaria*

The rock in the stream bed breaks into larger pieces than the rock below. The shale here is dark blue grey.

1495'30" - 1500'35" - same shale:-
Pal. concentrica, *S. liata*, (*C. mucronatus* cc, *C. scitulus*, *A. umbonata* and *S. pennatus* are all abundant. The rock in the Creek bed breaks into larger rather irregular slabs but where it has been exposed it crumbles into small chips. The stream here follows a gully cut between two joint planes.)

1500'35" - 1505'40" - *P. rana*, same as below.

1505'40" - 1510'45" - same
 1510'45" - 1515'50" - " shales a little more compact
 1515'50" - 1520'55" - *C. scitulus*, *A. umbonata*, *S. gemulosus*, *S. pennatus*, *Par. hamiltoniae*, *C. coronatus*, *Pal. concentrica*, *C. mucronatus*, *P. cylindrica*, *N. bellistriata*, *S. arcuata*, *Strophophora* sp.,

1520'55" - 1525'60" - same shale - *Pradiata*, *Pal. fecunda*, *C. scitulus*, *M. pygmaea*, *P. discoides*, *N. Bellistriata*,

1525'60" - 1530'65" - *C. bellistriata*, cc. *T. carinatus*, *S. pennatus*, *P. rana*, *Lophotrocha* sp., *C. coronatus*. These shales are hard and dark grey.

1530'65" - 1535'70" - *C. bellistriata*

S. solenoides, *Lewipteria*, *N. bellistriata*,
C. coronatus, *Par. hamiltoniae*, *T. carinatus*,
S. pennatus, *A. umbonata*, *Pal. concentrica*,
P. rana,

1535'70" - 1540'75" - a calcareous lens
exists at 1535'70" but is of small extent.
Wood. P. discoidium, *A. umbonata*, *P. rana*,
C. bellistriata. In the lithology and
faunal character here the rock has
the look of the Moscow. The rock
is a soft dark gritty shale,
with considerable iron rust on the
surface. *A. umbonata* is abundant
here. *M. concentrica*, *G. arcuata*.

1540'75" - 1545'80" - at the top of this
interval fossils are abundant
S. granulatus, *R. vanuxemi*, *A. decussata*,
M. concentrica,

1545'80" - 1550'85" - same shale

1550'85" - 1555'90" same

1555'90" - 1560'95" - *S. perversa* large, *C. mucronatus*,
C. bellistriata, *B. ellipticus*, *T. carinatus*,
M. concentrica, *C. coronatus*, *S. pennatus*,
Par. hamiltoniae, *R. vanuxemi*, *A. reticularis*,
M. nuptioides. These rocks also have
the look of those at Georgetown
S. granulatus

1560'95" - 1565'100" - At the top of this
interval is a hard band 8" thick
that forms a fall. It has

H. delavayi *S. inaequistrata*

S. granulosa *C. coronatus*

It is very hard blue-gray calcareous rock.

1565' 100" - 1570' 105" - *H. lirata*, *S. pennatus*, *H. oblongatus*, in the shales between the two hard bands as another is about 14' above that at 1565' 100".

1570' 105" - 1575' 110" - *C. scitulus*, *H. triquetra*, *S. pennatus*, *O. undulata*, *G. bivalcata*

1575' 110" - 1580' 115" - 3' above 1575' 110" comes a hard layer of calcareo-arenaceous matter with *T. carinatus*, *Productella*.

S. perplana, *C. coronatus*, *S. pennatus*, *S. granulosa*, this band is about 9" thick. Above it are rather soft blue gray shales.

1580' 115" - 1585' 120" - *H. lirata*, *S. uncinatus*, *G. acuta*, The rocks are not very fossiliferous.

1585' 120" - 1590' 125" - a cascade over rocks that are rather hard, calcareous and sandy, forming a cascade, *T. carinatus*, *S. perplana*,

1590' 125" - 1595' 130" - *T. carinatus*, *C. elongatus*, *S. pennatus*. The rocks break into large slabs here.

1595' 130" - 1600' 135" - *S. pennatus*, *T. carinatus*, At 1600' 135" the rock is very hard calcareo-arenaceous with *S. granulosa*, *S. pennatus*, 3" thick. Small aggregations of shell

shell ls. als. or occur.

1600' 135" - 1605' 140" - softer shales with a purple weathering.

C. conungata, *S. pennatus*, *C. mucronatus*
4' of shell mounted by 4" of hard calcareous stone.

1605' 140" - 1610' 145" - hiatus.

1610' 145" - 1615' 150" - Blue-grey shales with abundance of *S. pennatus*, *P. saua*, *Cyst. horn*, *Camerozochia*, *O. conungata*, *P. conungata*, *C. scitulus*, *P. fimbriata*, *Pholidops*. These shales are like those at 1600'.

1615' 150" - 1620' 155" - same. *Aviculopora*, *S. pennatus*, *S. crocatus*, *P. munita*, *A. reticularis*, *P. marginata*, *P. discoides*, *M. pygmaea*, *S. perplana*.

1620' 155" - 1625' 160" - at 1 1/2' below 1625' 160" comes a 3" band of calcareo-arenaceous stone. A foot above this is a thin layer of calcareous rock with *Turbo* *Gerebratulids*. It is 1 1/2" thick. Below it is about 1' of shale. This layer has *T. laura*, *C. scitulus*, *A. spiriferoides*.

1625' 160" - 1635' 170" - shales breaking into large pieces.

1635' 170" - 1640' 175" - some olive-colored from weathering.

1640' 175" - 1645' 180" - Blue grey coarse hard shales.

1645' 180" - 1650' 185" - *M. mytiloides*,
Fossils are rare.

1650' 185" - 1655' 190" - same

1655' 190" - 1660' 195" - *J. carinatus*,
S. pennatus, *Taomurus*.

At top of 1660' 195" is a 3" layer of
blue grey ls. with *J. carinatus*, a coral
was seen in the arenaceous rocks
below it. Most of these rocks are
calcareo-arenaceous in this
interval.

1660' 195" - 1665' 200" - Hard sandy sh
rock *J. carinatus*. The top rock at
1665' 200" has *R. vanbyemii* C,
S. pennatus, *J. carinatus*, *C. mucronatus*,
A. serpens, *C. bellistriata*, This was
hard calcareo-arenaceous rock.

1665' 200" - 1680' 215" - hiatus

1680' 215" - 1685' 220" - soft very dark
blue grey rusty shales. a *Spindleria* sp.

1685' 220" - 1720' 255" - hiatus - stream ends.

Many flat ss. slabs were found in the
interval from 1660' 195" - to the end of the
ravine. This gully branches + shows
some rock but the exposure is too
small, narrow + covered by debris to
be studied.

Sept 22.

Ravine A.

Derryton - East side valley
Road at foot of gully at 1310.

1300 - 1345' 45" hiatus

1345' 45" - 1350' 50" - hard sandy shale or massive fine sandstone of rather light color and uneven weathering bearing plentiful but poorly preserved fossils. Fossils are longwinged *Spizans pinnatus*, *C. mucronatus*, *C.* The top layer effervesces with acid when bruised. The stone is very hard.

1350' 50" - 1355' 55" - In the middle of this step - sandy sh. with *S. pinnatus* cc, *P. tenuistriata*, *T. cainatus*, *P. sectifrons*, *C. spiniferoides*, *S. granulosa*. These are softer than those below and dark blue grey with considerable gritty matter.

1355' 55" - 1360' 60" - hiatus

1360' 60" - 1365' 65" top 3' of this interval are blue grey gritty shales like those below.

1365' 65" - 1370' 70" - 5' at bottom of this interval 5' of resistant slightly calcareous sandy shales containing:-

<i>M. concentrica</i> re	<i>S. perversa</i> re
<i>T. cainatus</i> re	<i>C. mucronatus</i>
<i>S. pinnatus</i>	<i>P. patulus</i>
<i>P. flabellum</i> re	
<i>S. granulosa</i>	
<i>C. bellistriata</i>	

Dickinson 1433' 135'

30'

8. Dickinson 1405' 110'

20' 1265' 65'

1365' 50"

average 5'

H
I
A
T
U
S

1301

Each sq 5' 5"

251/81. Demissa

- About $\frac{1}{2}$ ' below top of interval
- | | |
|-------------------------|--------------------|
| ✓ C. coronatus | Adiculopecten |
| ✓ S. granulosis c | P. flabellum re |
| B. leda | J. carinatus re |
| Goniophora cf. carinata | C. bellistriata re |
| Phalldostrophia ? re | ✓ S. demissa re |
| ✓ P. oviformis | ✓ S. pennatus c |
| ✓ M. concentrica | ✓ S. perplana |
| ✓ S. andaculus | M. bellistriata |
| ✓ A. spiniferoides re | |

1370' 70" - 1375' 75" - sandy shale breaking into irregular layers with:-

- | | |
|------------------|-----------------|
| P. flabellum | C. bellistriata |
| S. pennatus | M. oblongatus |
| J. carinatus | S. perplana |
| P. vanuxemi | M. concentrica |
| Par. hamiltoniae | |

1375' 75" - ^{1395' 100} ~~1405' 100~~ - 3' at top, liatus - bottom
arenaceous, blue-grey shale slightly
calcareous breaking into irregular
lumps.

Leiopteria sp.

C. bellistriata

- S. pennatus cc
J. carinatus cc
M. concentrica

The rock in the top 10' here has
S. demissa + P. leda, re-occur-
ing the zone with Pelaeophylloids
below the 2nd S. demissa zone.

^{1395'} ~~1405'~~ 100' - 1400' 105" - The rock is harder
and sandier & less fossiliferous

S. pennatus
J. carinatus
H. dekeyi

1400' 105" - 1405' 110" - shaly ss with
S. perplana becoming at the top 1 or $\frac{1}{2}$ "
and calcareo-arenaceous rock with
P. flabellum^c, S. capillaria^{re}, J. carinatus c

S. pennatus, *S. granulosis*, *S. demissa*,
~~*S. chesterensis* *Aviculopora*~~

The second *S. demissa* zone then 2nd *D.*
 commences at the top of 1405' 110"
 1405' 110" — 1410' 115" — Rock becoming shaly
 but with much grit: — *S. demissa*, *P. rana*,
T. carinatus, *S. pennatus*, *M. concentrica*,
Leiopteria sp., *S. andalus*, *S. granulosis*,

1420' 115" — 1425' 120" — *S. pennatus*, *S. demissa*,
C. bellistriata, *P. flabellum*, *Productella* sp.,
T. carinatus, *C. scitulus*, *S. granulosis*, *A. reticularis*,
O. parvula, *S. perplana*, *H. dehayi*, *C. scitulus*,
S. demissa disappears in about the middle of this zone
 1415' 120" — 1420' 125" — at top *S. granulosis*,
T. carinatus, *S. pennatus*, *Cystodictya* sp.,
C. bellistriata, *B. ledoy*, *A. reticularis*,
C. imbricata, *M. concentrica*, *P. oviformis*,
S. perplana, *Productella* sp.

1420' 125" — 1425' 130" — *C. scitulus*, *T. carinatus*,
S. pennatus. The rock is a blue grey
 shale like the Earlville sh.

1435' 130" — 1433' 135" — *T. carinatus* at top
 here is in several layers about 20"
 thick, bottom 1 1/2" is nodal and fossiliferous
 138' Mss. above (exposed). Collecting poor.

B.

1305 — start of hand-levelling

1305 — 1365' 60" — hiatus

1365' 60" — 1370' 65" — Hard sandy rock, massive with *J. carinatus*

1370' 65" — 1375' 70" — sandy stone

1375' 70" — 1380' 75" — at bottom 2' sloppy ss. going into massive calcareous ss. with *S. demissa*, *S. andaculus*, *P. flabellum*, *A. reticularis*, *J. carinatus*, *A. princeps*, *M. concentrica*, *S. pennatus*. This is the second *S. demissa* zone.1380' 75" — 1385' 80" — *A. bulbosus*, *P. flabellum*, *S. pennatus*,1385' 80" — 1390' 85" — blue grey shales abounding in *S. pennatus*, *J. carinatus*, *C. scitulus*; *S. perplena*~~1400~~¹³⁹⁰ 85" — 1395' 90" — blue grey sh. ^{soft} *S. pennatus*, *S. granulatus*, *J. carinatus*1395' 90" — 1400' 95" — same *C. scitulus*, *J. carinatus*1400' 95" — 1405' 100" — *Pal. constriata*

1405' 100" — 1410' 105" — poorly exposed here

~~Trichanor~~
40 30

- 1410' 105" — 1412' 105" — *Tichenor* ?
 1412' 105" — 1417' 110" — hiatus
 1417' 110" — 1422' 115" — At bottom 1 1/2' of soft
 blue grey shales with *Taronius*, *T. carinatus*,
Crin. ham. Crinoid stems.
 1422' 115" — 1447' 160" — hiatus
 1447' 160" — 1452' 165" — bottom 3' hiatus
 Soft dark bluish grey shales with
C. mucronatus, *A. umbonata*, *Leiopteria*
 1452' 165" — 1457' 170" — *S. pinnatus*, *P. rana*
P. constricta, *C. bellistriata*, *C. coronatus*,
C. setigerus, *Pholidops*, *M. pygmaea*,
N. oblongatus, *Lox. ham.*, *Elidgula* sp.,
N. bellistriata,
 1457' 170" — 1462' 175" — *C. scitulus*, *P. rana*,
C. setigerus, *Lox. ham.*, *M. pygmaea*,
 1462' 175" — 1467' 180" — Bottom 2' same
 Upper 3' hiatus
 1467' 180" — 1472' 185" — *P. constricta*,
A. umbonata, *P. holidops*, *S. pinnatus*,
M. pygmaea, *P. radiata*, *P. munda*,
C. scitulus cc, *P. rana*,
 1472' 185" — 1477' 190" — bottom 2' same
 Upper 3' hiatus
 1477' 190" — 1482' 195" — hiatus
 1482' 195" — 1487' 200" — hiatus
 1487' 200" — 1512' 225" — hiatus — ravine
 peter out. The mapping here is

incorrect, as the gully disappears at a terrace at about 1600' A.T. The gully was not seen. An Ambocoelia zone follows closely on the Pichenon.

The shale of the mid S. demissa zone is like the Earlville sh.

Sept. 25

Demyter Ravine ^{Arab hill north end Reservoir}
 Stream crosses road at 1310' A.T.

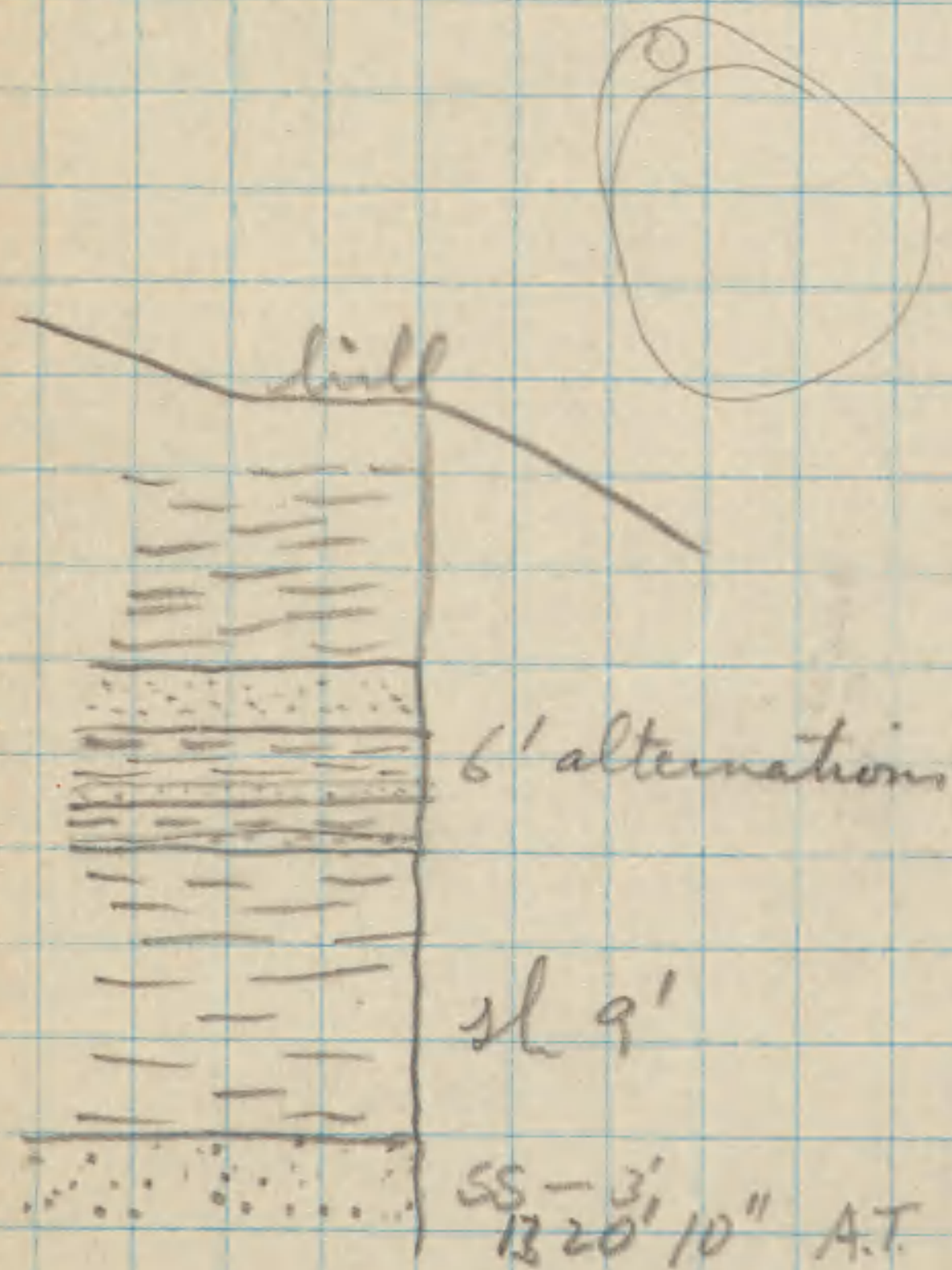
1310' - 1315' 5" - blue grey sandy shales with *S. pennatus*, *C. mucronatus*, *A. spinifer*, *B. leda*, *G. capillaria*, *J. carinatus*. The *S. pennatus* is very abundant.

1315' 5" - 1320' 10" - hiatus in stream-bed.

To the south and at the entrance to the ravine is a quarry with a section somewhat as follows

Each square 3' at the bottom are ss. in for 3' in 2 layers about 1 1/2' thick each. This is

succeeded by blue grey shales for about 9' which is followed by ss alternations for about 6'. In the six feet there is at the bottom a 6" layer of ss; then 12" sh, 9" ss, 2 1/2" sandy sh. and finally 1 1/2' layer of ss. This layer is followed by about 7' of blue grey shale



Fossils in the 1 1/2' layer of ss near the top can be determined from a dislodged block and are
J. carinatus c.c. *P. flabellum* or
S. pennatus c. *R. vanuxemi*

A. spiriferoides
M. concentrica
C. bellistriata
P. stylopoda
S. parplona

Gon. hamiltonensis
C. tenuistriata
S. granulatus
S. perversus
C. princeps

1320' 10" - 1325' 15" - about 2' below the top
 of this interval come the ^{calcareous} mentioned at
 the bottom of this quarry. These have
S. granulatus, *S. pennatus*, *C. mucronatus*,
 The blue grey shales on these have
S. pennatus cc
I. carinatus
C. recurva small
S. channingensis
S. capillaria

C. bellistriata
A. spiriferoides
S. granulatus
C. boothi

The sandstones are quite calcareous,
 even having local concentrations of ls.
 The shales are blue grey and like the
 Earlville shales in appearance &
 texture. The great abundance of long-
 winged *S. pennatus* is striking.

1325' 15" - 1345' 35" - hiatus

1345' 35" - 1350' 40" - hiatus for 3 1/2' at the
 top there are about 1 1/2' of blue grey shales
 and about 9" of resistant & sandy
 rock. The latter has *I. carinatus* &
S. pennatus in abundance. *N. trigonatus*
A. erectum in the shaley part.

S. pennatus, *S. arcuatus*, *M. concentrica*
C. cordatus, *P. lanceolatus*, *P. flabellum*,
P. emarginata, *S. capillaria*, *C. bellistriata*,
Lophospira sp., *C. scitulus*

1350' 40" — 1355' 45" — blue grey shale
G. arcuata, *S. pennatus*, *T. carinatus*,
C. bellistriata, *P. flabellum*, *M. concentrica*,
C. scitulus, *P. constricta*, *P. discoidum*,
A. princeps.

1355' 45" — 1365' 55" — same below for about
 7', but the top has become more sandy
 and forms a 10' cascade.

1365' 55" — 1380' 70" — sandy shales for about
 8' and sandstones for 5'. The passage
 from the shales to the ss. is very
 gradual, almost unperceptible. 1380'
 70" brings the observer to the top of a
 second cascade. The 1 1/2' on top of 1380' 70"
 and the very brink of the cascade
 are calcareous-arenaceous shale rocks,
 very resistant. *T. carinatus* & *S. pennatus*
 are the prevailing fossils in the ss.
 Fossils in the upper 1 1/2' of the 2nd
 cascade are: —

<i>C. boottii</i> r	<i>P. flabellum</i> r
<i>G. capillaria</i> r	<i>Grammysia</i> sp.
<i>T. carinatus</i> cc	<i>S. granulosa</i> r
<i>A. decussata</i> r	<i>A. reticularis</i> r
<i>S. pennatus</i> c	<i>A. princeps</i> r
<i>S. demissa</i> (? not in place)	<i>S. perplana</i> r

1380' 70" — 1385' 75" — blue grey fossiliferous
 shales.

<i>C. scitulus</i> r	<i>S. pennatus</i> r
<i>G. arcuata</i> r	
<i>P. flabellum</i> r	
<i>T. carinatus</i> c	
<i>S. granulosa</i> c	

At 1380' 70" a slab was seen with *S. demissa* in it. The slab appeared to be in place but I could not be sure of it.

1385' 75" — 1390' 80" — blue grey shales with a resistant layer at the top forming a low escarpment.

1390' 80" — 1395' 85" — blue grey shales

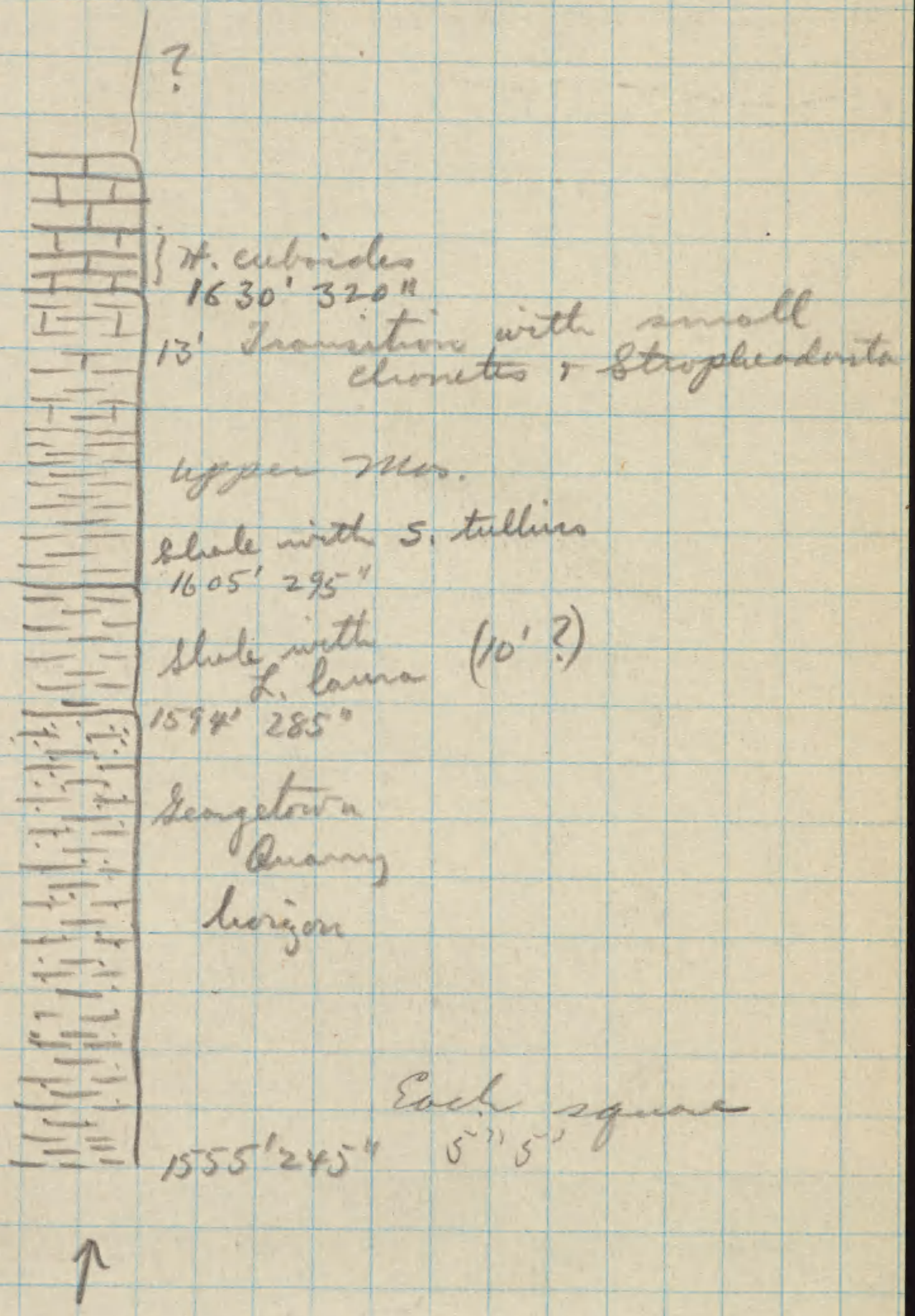
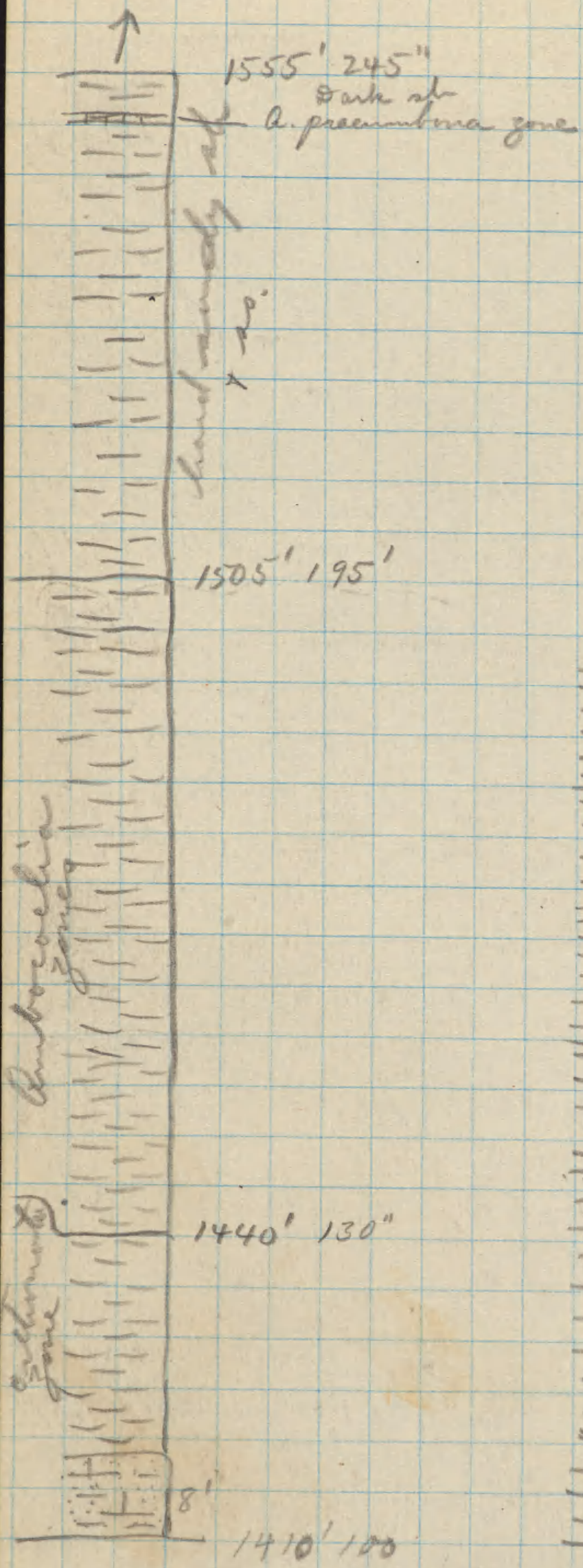
1395' 85" — 1400' 90" — blue grey shales with
C. scitulus cc. *T. carinatus*
M. concentrica *S. pennatus*.
Gon. hamiltonensis

1400' 90" — 1405' 95" — blue grey sh.

T. carinatus *B. leda*
S. pennatus *Pal. constricta*
C. scitulus

The shales are not greatly fossiliferous.

1405' 95" — 1410' 100" — These shales continue to about 2' from the top of this interval when two layers of ls. are seen. These are much fluted from solution weathering. Below the ls. there are about 2" of calcareous sandstone. Then a 9" layer of ls. which is blue grey and not unlike the Tully. This lower layer is crowded with shells and some enroid debris. The shells are *S. pennatus*, *T. carinatus*. The second layer is of the same thickness but has practically no fossils.



1410'100" - 1415'105" This is succeeded by calcareous sandy rocks with:-

P. rana r
S. pennatus r
 Crinoid stems r
A. decussata r
R. vanuxemi r
 Cran. hem.
Pterinopecten sp.

T. carinatus r
S. macronotus r
M. concentrica r
Par. hamiltoniae r
S. perplana
C. bellistriata
Camarotoechia sp.

1415'105" - 1420'110" - about 2 1/2' of this horizon is composed of these calcareous sandy shales and the 2 1/2' is capped by about 3" of very hard sandy rock forming a cascade above the "Tichenor" (?) This 8 or 9' above the ls are sandy calcareous shales and are exceedingly difficult to collect.

On this 2' of dark soft faintly gritty shales with:-

S. pennatus cc
Grampsis sp.

C. scutulus c

Moscow

1420'110" - 1425'115" - the shale is quite brittle, and hard but very fossiliferous

T. carinatus c
C. mucronatus
N. triquetra
Pholadella parallela c
N. bisulcata

P. radiata r
B. leda
N. corbuliformis
P. patulus
A. erectum

1425'115" - 1430'120" - Same

P. radiata
P. parallela
N. triquetra
Pal. concentrica

Leopteria
Pterinopecten

1430' 120" — 1435' 125" — same shales.

N. oblongatus
P. radicata c
S. pennatus
C. setigenus
P. constricta
N. triquetra
S. perversa

N. bellistriata
C. scitulus
A. spiriferoides
C. mucronatus
B. leda
C. setigenus

In the middle of this interval the shales lose their brittleness.

^{78'}
 1435' 125" — 1440' 130" — *Chonetes* is very abundant here. *S. perplana*, *A. umbonata*

1440' 130" — 1445' 135" —

N. bellistriata
C. scitulus
A. umbonata a
S. pennatus

Pholidops ham.
P. constricta
N. oblongatus.

^{62'}
 1445' 135" — 1450' 140" — *C. scitulus*, *S. pennatus*
A. umbonata, Fossils not very abundant

1450' 140" — 1455' 145" — *C. mucronatus*,
C. setigenus, *A. umbonata*, *T. submarginata*
S. pennatus, *C. scitulus*, *Orthoceras* sp.
N. oblongatus, *Pholidops ham.*, *P. constricta*
P. discoidellum — at top *Ambocoelia* is very rare.

1455' 145" — 1460' 150" — *N. triquetra*, *P. plana*,
P. rana, *H. dekanji*, *S. pennatus*,
C. mucronatus, *P. constricta*, *C. scitulus*
A. umbonata,

1455' 145" — 1460' 150" — *P. rana*, *P. tenuis*,
C. scitulus, *C. setigenus*, *A. umbonata*,
O. undulata, *S. cheunungensis*,

C. terminatus, *C. boothi*, *P. radiata*,
H. deKayi, *S. perplana*, *N. bellistriata*
O. parvula, *C. bellistriata*.

1460' 150" — 1465' 155" — same

1465' 155" — 1470' 160" — *I. carinatus*,
P. radiata, *N. bellistriata*, *C. bellistriata*,
P. constricta, *C. mucronatus*, *C. scitulus*,
G. arcuata, *N. triquetra*, *S. perplana*,
C. scitulus, *P. cylindrica*, *S. pinnatus*,
N. lamellata, *N. oblongatus*,

1470' 160" — 1475' 165" — *Palaeoneilo perplana*?
C. indenta, *S. pinnatus*, *R. fimbriata*,
P. constricta, *C. bellistriata*, *I. carinatus*,
C. mucronatus, *Par. hamiltoniae*, *N. oblongatus*,
N. bellistriata, *C. perversa*, *H. achis*, *S. perplana*,
P. rana,

This horizon is the same as that
shown in the ravine at Georgetown

1475' 165" — 1480' 170" — *A. umbonata*, *C.*
S. perversa, *P. emarginata*,

1480' 170" — 1485' 175" — *R. vanuxemi*,
A. decussata, *S. pinnatus*, *A. umbonata*,
M. concentrica, *C. indenta*, *S. granulosis*,
P. radiata, *R. fimbriata*, *C. scitulus*,
N. triquetra,

1485' 175" — 1490' 180" — *C. scitulus*,
C. bellistriata, *S. muricatus*, *C. mucronatus*,
A. umbonata, *A. reticularis*, *S. granulosis*,
~~*A. umbonata*, *I. carinatus*,~~

1490' 180" — 1495' 185" — *R. fimbriata*,
M. concentrica, *S. perversa*, *P. constricta*
~~*P. h. Par.*~~ *hamiltoniae*, *P. rana*,
S. granulosa, *A. reticularis*, *P. tenuistriata*
R. reticularis, *C. tenuistriata*, *C. coronatus*,
S. perversa, *S. granulosa*, *R. umbonata*,
T. carinatus, *H. acilis*, *N. triquetra*, *G. capillaria*,
C. mucronatus,

1495' 185" — 1500' 190" — *P. rana*, *N. oblongatus*,
P. muta, *N. triquetra*, *G. capillaria*,
C. coronatus, *N. bellistriata*, *C. mucronatus*,
L. rostellata, *P. discoideum*, *P. constricta*,
S. pennatus, *O. undulata*,

1500' 190" — 1505' 195" — same — *Amboecia*
 appears to run out here + 2'

1505' 195" — 1570' 200" — 2' above the lowest
 portion of this interval comes a calcareo-
 arenaceous band that forms a cascade.
 This is 2 or 3' thick. It has *T.*
carinatus, *P. rana*, *Aviculopecten* sp.,
N. bellistriata.

At the top of this interval:—
P. radiata *N. bellistriata*
N. oblongatus, *N. triquetra*

1510' 200" — 1515' 205" — hard sandy
 sh:— *C. tenuistriata*, *N. bellistriata*,
S. crataegum,

1530' 220"
1505' 195"
25'
29'

264

1505'
16'
1523'

1550'
1523'
27'

264

1515' 205" — 1520' 210" — limy sandy shale with *M. bellostriata*, *S. granulatus*, *Liopteria* sp., *H. capillaria*,

1520' 210" — 1525' 215" — hard calcareo-arenaceous rock with *S. granulatus*, *M. mytiloides*, *I. carinatus*, *S. arcuata*, *C. mucronatus*.

1525' 215" — 1530' 220" — *S. pennatus*, *M. mytiloides*, *S. perversa*, *C. boothii*, *C. mucronatus*, *C. scitulus*, *Cyst. ham.*, *R. leda*, *S. channingensis*, *C. tenuistriata*, *I. carinatus*,

1' above this interval in the next.
9" of calcareo-arenaceous rock.

1530' 220" — 1545' 235" — hiatus.

About 2' below 1545' 235" come shales with *R. fimbriata*, *A. reticularis*, *M. liata*, *Cyst. ham.*, *Cystodictya*,

1545' 235" — 1550' 240" — *Platyceras* sp., *R. vanuxemi*, *C. scitulus*, *Orthoceras* sp., *S. pennatus*, *I. carinatus*, *A. reticularis*, *S. perversa*, *P. rana*,

1550' 240" — 1555' 245" — ^{foot} *Orthoceras* sp. in this there is a 4" limy band with *A. spiriferoides*, *I. carinatus*, *I. laura*, *A. praeumbona*, *P. constructa*, *M. mytiloides*. Upon this hard layer are shales with *A. spiriferoides*, *I. laura*, *S. pennatus*, *S. granulatus*, *S. andaculus*, *I. carinatus*, *M. corbuliformis*.

$$\begin{array}{r} 1595 \\ 28 \\ \hline 1623 \end{array}$$

$$\begin{array}{r} 1443 \\ 168 \\ 25 \\ \hline 1545 \end{array}$$

$$\begin{array}{r} 19 \\ \hline 1564 \end{array}$$

$$\begin{array}{r} 1575 \\ 22 \\ \hline 1553 \end{array}$$

$$\begin{array}{r} 1618 \\ 1597 \\ \hline 21 \end{array}$$

$$\begin{array}{r} 1597 \\ 1575 \\ \hline 22 \end{array}$$

$$\begin{array}{r} 1618 \\ 1597 \\ \hline 21 \end{array}$$

$$\begin{array}{r} 1597 \\ 1575 \\ \hline 22 \end{array}$$

P. rana,

The shales extend up. for 4'. but then are covered. I did not observe S. tullis here.

1555' 245" — 1575' 265" — hiatus — a few feet of dark unfossiliferous sh. was seen at 1555' 245" — 1560' 250".

1575' 265" — 1580' 270" — ~~small~~ compact Taomum — apparently diagnostic of upper Morcon. The shale is hard & sandy.

1580' 270" — 1585' 275" — sandy shale with O. undulata, S. pennatus, H. triquetra, J. carinatus, P. tenuis, P. patulus, L. rostellata, P. rana, H. striatus, H. achis, C. tenuistriata. 1585' 275" — 1590' 280" — In the middle of this interval there is a one foot sandstone (calcareous band).

1590' 280" — 1595' 285" — these sandy calcareous hard rocks terminate at 1594' 285" and represent the hard rocks seen in the quarry at Georgetown. They are succeeded by soft dark sh. 1' in this step.

1595' 285" — 1600' 290" — S. pennatus, C. setigenus, P. emarginatus, L. lanna rare in the 1st 3'. H. oblongatus,

1643
1619
24
266

1643

1595
266

1600' 290" — 1605' 295" — same but
without *L. laura* — exact range ^{could not} be determined
1605' 295" — 1610' 300" — ^{it must be 10' or} here *S. tullius*
becomes rather prominent along
with *G. carinatus*. Other fossils are
C. scitulus, *C. setigerus*, *M. liata*,
N. corbuliformis. The shales also become
harder + coarser here.

1610' 300" — 1615' 305" — *A. reticularis*
A. princeps. Shale soft. collecting is
very difficult as the ravine is very
steep and choked with debris.

1615' 305" — 1620' 310" — Hard sh. few fossils

1620' 310" — 1630' 320" + one foot brings the
base of the Tully. This brings the base
of the Tully at 1658'. The rock in this
interval is hard, much of it calcareous.
Collecting is difficult if not almost
impossible. *C. setigerus*

In the shales below the first
conspicuous ls. band of the Tully
which bears abundance of
H. cuboides were seen abundant
small chonetes + strophodontas.
These may be *Chonetes aurora* and
S. mucronatus respectively. I cannot
place them in the Hamilton. The
lowest these were seen was
in a resistant ledge at 1621' 310".
3' below this ledge *S. pernatus* is
common in the shale. 6' below

this hard layer were seen
C. boothi & *C. tenustrata*. The top of
 the Moscow must be at about
 1618' 307". The rock just below the
 1st bed with *Hypothyris* breaks in
 elongate masses like that at
 Jinkens Falls. There are about
 13' of transition rocks, below the
Hypothyris bed and on top of the
 Moscow.

Hard-levelling down from base
 of *H. cuboides* zone there were 44
 steps

In this ravine I did not
 actually find *S. demissa* in place
 but I believe the horizon is 30'
 below the "Tichenor". The Tichenor
 is like that elsewhere seen. On the
 Tichenor were about 8' of calcareous
 sandy shales, then some shales, which
 were quite soft and contained
Pholadeflexa. I believe this belongs to
 the *Orthonota* zone of Cleland. Above
 this the *Ambocoelia* zones could be
 followed. There are 95' of shales in
 the *Ambocoelia* & lower zones, and about
 81 or 82' (71 or 72' minus transition) zone of
 rock from the *A. praecumbens* zone to
 base of Tully.

There appear to be about 13' of
 limy shales between the first bed with
H. cuboides and the top of the shales. The
 close of the Moscow is at the hard

268

268

shales with abundant *Spermatozoa*

Sept. 32269
Derryter
Ravine C

269

S. demissa zone at 1310' A.T. + 70' 70".

Tichenor at 1310' + 95' 95". The Tichenor is exactly 5 hand-level steps above the *S. demissa* zone.

The Tichenor occurs at 1413' A.T. & it is here in 3 layers, and is about 2' thick. It is not crinoidal to a marked degree here & looks like the Tully.

On the Tichenor comes about 8' of hard calcareous stone.

15' above Tichenor stone is a blue grey shale with *M. subolata*, *Bryidea*, *Par. diam.*, *A. umbonata* seen between 5 + 6 steps.

at 10th step *C. mucronatus* c.

at 21th step a hard band with *L. papylosa*

Bottom of Tully is at 1657'.

Sept. 10.

Handbelling begun at 815' A.T.

Upper part on Shumans untata - Shumans gully.
A.C. Snyder.

815' - 885' 70" - covered

885' 70" - 890' 75" - very dark grey fine grained brown shale
with brownish white streak. The rest like the Massena.890' 75" - ~~945'~~ 945' 130" - same dark grey soft shale,
irregular fracture, irregular joints. Fossils very rare.
Two feet below the top of 945' 130" is a layer of large
concretions, ^{90-1"} septaria. Brachiopods seen near surface.*Orthis* sp.*P. discoides*

945' 130" - 990' 175" - covered

990' 175" - 1010' 195" - soft dark grey shale, weathering
brownish. *A. umbonata*, *B. subulata*

1010' 195" - 1015' 200" covered.

1015' 200" - 1045' 230" - same shale few fossils

*Orthis**Leiorhynchus*?

1045' 230" - 1053" - 235" - covered

1050' 235" - 1075' 260" same shale

*L. pinnatus**L. laura**P. fragilis**P. discoides**C. atigues**Orthis* sp.1075' 260" - 1080' 265" - shale crumbles in
small pieces. small concretions*L. umbonata**C. atigues**L. laura**L. pinnatus**A. subulata*

1080' 265" - 1085' 270" - same shale

C. mucronatus

1085' 270" - 1090' 275" - same shale

*L. pinnatus**L. pinnatus**A. subulata**C. scitulus**C. mucronatus**C. vicinus**M. corbuliformis**A. umbonata* *C. pinnatus**B. pinnatus*

1090' 275" - 1095' 280" - same shale, softest

23

*L. pinnatus**P. constricta**A. subulata**L. laura**P. pinnatus**M. pinnatus*

111

$$\begin{array}{r} 355 \\ 385 \\ \hline 70 \end{array}$$

1095' 280" - 1100' 285" - covered, stream fossils here.

1100' 285" - 1110' 295" - covered. In the other gully the upper 5' is in massive sandy shale with a fauna like that below.

1110' 295" - 1120' 305" - hard massive shale, with practically no fossils. Shale breaks into thick lumps and looks like an irregular mass of clay in the stream bed.

1120' 305" - 1125' 310" - covered

1125' 310" - 1130' 315" - lower 3 1/2' covered, upper 2' ✓ massive lumpy shale. rocks. *A. umbonata*

✓ 1130' 315" - 1135' 320" - same rock

P. radiata *P. constriata* *C. mucronatus*

1135' 320" - 1140' 325" - same rock

C. mucronatus *A. andacula* *P. spinulicosta*

A. umbonata *T. carinatus* *M. pygmaea*

1140' 325" - 1150' 335" - covered.

1150' 335" - 1160' 345" - hard amaceous shale like that in the lower part of Knight's gully.

T. debarji *P. constriata* *A. andacula*

T. carinatus *P. flabellum* *Camarotoechia*

✓ 1160' 345" - 1165' 350" - lower 4' covered.

Upper 1' same hard sh. but more fossiliferous. The sh. is becoming softer.

T. carinatus *Gon. carinata* *C. mucronatus*

P. retusa *M. oblongatus* *M. subalata*

Pal. constriata *L. perplana* *P. spinulicosta*

✓ 1165' 350" - 1170' 355" - soft shale. Fossils are not abundant till about 2' above the base of this interval.

A. andacula *L. perplana* *M. subalata*

T. carinatus *M. oblongatus* *P. flabellum*

G. arcuata *M. conputrica* *C. vicinus*

At the top of the interval is about 12" of harder rock forming a fall. The following were seen in the upper rock:

C. boothi *E. lucina*

P. constriata *P. iowensis*

C. vicinus *Rosby bryozoa*

L. perplana *R. laevis*

$$\begin{array}{r} 26 \\ 5 \\ \hline 130 \end{array}$$

$$\begin{array}{r} 1320 \\ 1200 \\ \hline 120 \end{array}$$

S. erotalum
R. fimbriata
A. princeps
M. oblongatus
Panembla

D. lineatum
T. caninatus
B. sulcomarginata
M. pygmaea
Par. ham

C. indenta
H. dekarji
M. concinna
Pholidops
P. flabellum

The hard layer consists of ls. and some shale, the lime at the bottom. The *Tropidoleptus* zone comes about 3' below the calcareous layer with the corals. On a hand level I made 14 1/2 steps from the side gully at 1100' 285" to the top of the Mottled hard layer.

Top of Delphi is at about 1320' A.T. giving about 120' for the Delphi. I hand levelled out of the marine at 1440' which I believe is excessive by 20'.

$$\begin{array}{r} 1455 \\ 70 \\ \hline 1350 \end{array}$$

$$\begin{array}{r} 245 \\ 135 \\ \hline 70 \end{array}$$

Sept. 2.

Fossils seen in blocks of rock from upper ledge of upper falls at Delphi

P. spinulicosta a *Par. ham.*

P. rowi

P. emarginata

Euphemus ?

S. perversa

Vitulina ? (mostly)

S. pennatus

Cyrtina as it is punctate

A block with *C. coronatus*, *A. reticulatus* & *A. cora* in abundance was seen ~~below~~ at the base of the lower falls having slumped from above.

Sept 18.

Ravine (1) at Eneville on
Property of L. C. Burton.

40' above the railroad tracks at about ^{155'} ~~166'~~
A.T. are found large exposures of
arenaceous shales, which in the lowest
layers carry abundance of *S. pennatus*
and *L. laura*. The rock is blue grey arenaceous
shale in a large exposure.

Fossils seen in the debris about the
exposures are:-

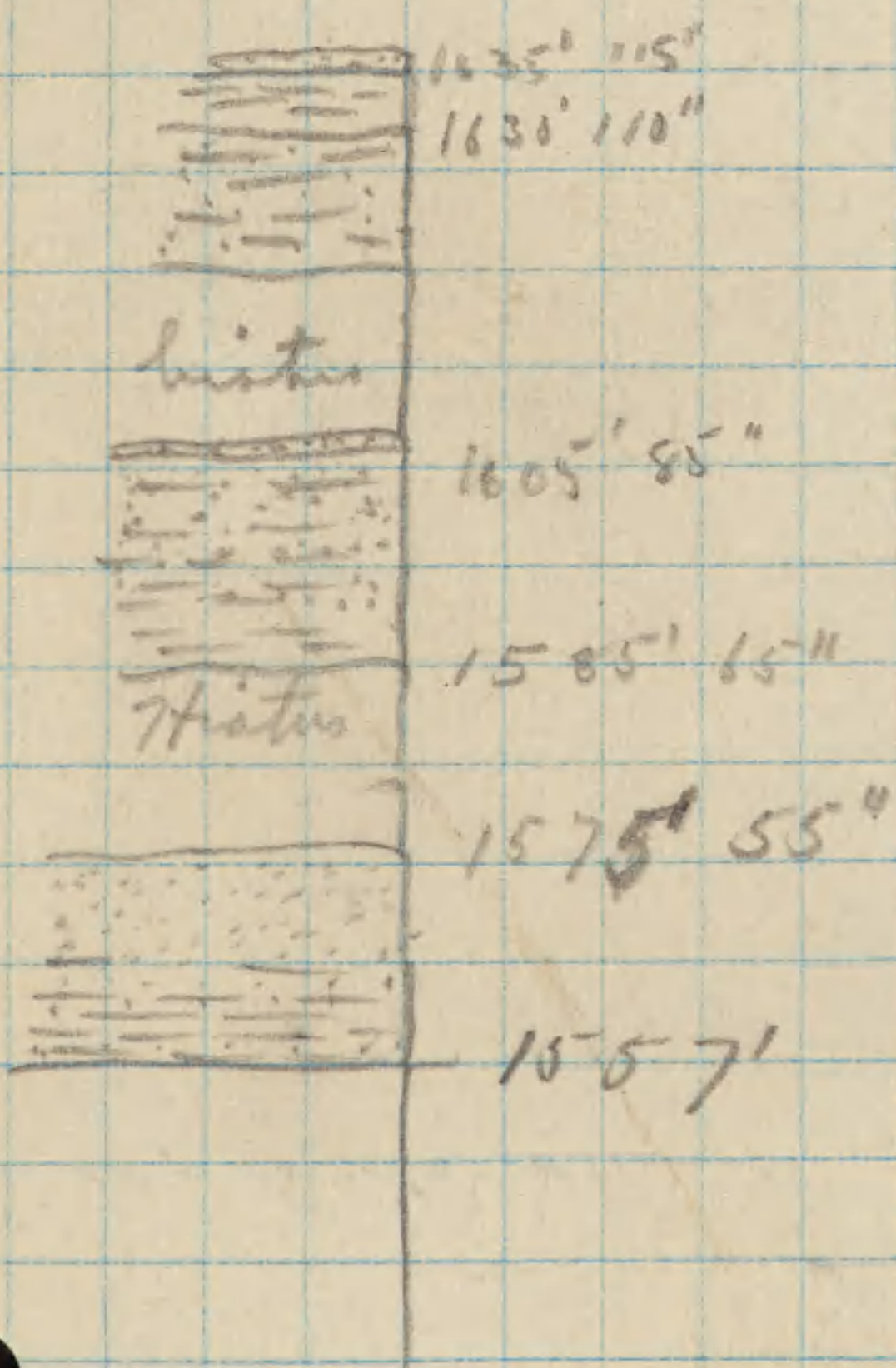
S. pennatus a
L. laura? a
T. submarginata &
C. coronatus
P. flabellum.

Grammysia
N. triquetra
Leiopteria

P. flabellum is fairly common at about
45' above the rr. tracks. The *S.*
pennatus is very broad-winged. The
L. laura is very large and coarse-
ribbed.

The lowest 5' of rock is most
certainly a sandy shale but this
becomes coarser and the *L. laura*
disappears in this interval. The rock
becomes continually sandier and more
resistant to wear. It breaks into
large slabs. It is grey in color.
Fossils seen in the ~~to~~ 10' from
the bottom of the exposure are
long-winged *S. pennatus* &
P. flabellum.

At the 11th step above the rr. comes
an abrupt change in lithology from
the sandstone to a coarse sandy



1520
55 55"

Each square 10'

shale rather dark grey in color.

The lower rock is decidedly sandy for about 12 or 15'

S. granulatus re

S. pennatus re

P. radiata re

S. concava (2)

M. concentrica

S. perplana ~

A. spiriferoides

I. cuneatus

P. oviformis

P. flabellum ~

Gram. hamiltoniae

C. boothii

This is exposed for 5' or more

Some of rock at contact is briny.

The abrupt change in lithology and the large number of *Strophodontas* is here very striking. The exposure differs in many respects from that at Fabius, notably in less abundance of *P. flabellum* and in the presence of large numbers of *S. concava*.

At 13 steps above R.R. (1585' 65") there is a small escarpment over sandy shale. The escarpment is about 7' high.

1585' 65" - 1590' 70" - *S. pennatus* c, *I. cuneatus* c, *C. mucronatus* c, *S. tullius*?, *C. coronatus* re. It is a coarse light bluish grey sandy shale.

1590' 70" - 1595' 75" - *Cyst. ham.* c, *I. cuneatus* c, *S. pennatus*, in a hard sandy rock.

1595' 75" - 1600' 80" - The rock has become increasingly sandy and forms the floor of the brook. A typical slab of this ss carries the following: -

C. coronatus &
Cyrt. ham., etc.

C. mucronatus, etc.
S. pennatus &

1600' 80" — 1605' 85" — the stone is
 shaken in a small cascade here &
 has *Orthoceras* sp., *I. carinatus*?, *H. dehayi*,
S. pennatus, *Cyrt. ham.*, *S. granulatus*,
 About 2' from the top of this
 interval there 3" of hard calcareo-
 arenaceous rock, light blue-grey in
 color with few fossils. The only ones
 noted were *P. plana*, *S. tullius*,
C. coronatus, *Cyrt. ham.*, *S. perversa*,
S. perplana,

1605' 85" — 1620' 100" — 2' below the top of
 this interval the first rock is seen
 above the calcareo - arenaceous band
 noted above. It is a sandy shale the
 true color of which cannot be made
 out. Fossils there are:—

- ✓ *S. pennatus* &
- ✓ *M. oblongatus*
- ✓ *S. ellipticus*
- ✓ *P. flabellum*
- ✓ *P. radiata*

1547
 60
 1597

1620' 100" — 1625' 105" —

- ✓ *C. mucronatus*
- ✓ *M. concentrica*
- ✓ *P. flabellum*
- ✓ *S. pennatus*
- ✓ *I. carinatus* &
- ✓ *I. submarginata*
- ✓ *A. erectum*
- ✓ *N. lirata*

same, a 5' cascade

- ✓ *P. constricta*
- ✓ *S. perplana*
- ✓ *A. fasciculatus*
- ✓ *Orthoceras* sp.
- ✓ *P. lirata*

1625'105" - 1630'100" The cascade flows over harder sandy rock in which may be seen *P. flabellum*, *J. carinatus*, *S. perplana*, *A. spiniferoides*, *P. radiata*, *R. ovumiformis*, *M. concentrica*, *S. pennatus*, *C. tenuistriata*, *C. bellistriata*, *S. perplana*, *J. carinatus*, *C. mucronatus*, *P. flabellum*, *H. debayzi*, *S. granulatus*

1630'110" - 1635'115" - sandy shales with at 1635'115" - the rock is thin slabby sandstone for 6 or more inches containing *S. perplana* + *J. carinatus*

1635'115" - 1640'120" - coarse shales & thin sandstones. 16.51
1.00

1640'120" - 1645'125" - a 1 1/2' layer of calcareo arenaceous stone at the top of this interval has: *S. pennatus*, *J. carinatus*, *P. flabellum*, *M. concentrica*, at the top of this horizon the rock is a shale & has: - *S. pennatus*, *M. concentrica*, *P. flabellum*, *C. bootii*, *P. oviformis*, *C. bellistriata*, *A. reticularis*, *A. princeps*, *S. perplana*, *C. scitulus*, the shale is rather soft & much discolored by rust. *S. granulatus*, *Taorminis*, hiatus for all but about 1' at bottom

1645'125" - 1650'130" - hiatus for all but a foot at top - sandy sh. with *S. perplana*, *S. pennatus*, *P. flabellum*, *Taorminis*, in the stream bed at the top of this interval some calc scattered in rock

makes it hard & resistant.

● 1650' 130" - 1655' 135" - the rock is a blue grey gritty shale with
M. concentrica^c, *S. pennatus*^c, *J. carinatus*^c
P. flabellum, *A. serpens*, *S. granulosa*.

1655' 135" - 1685' 165" - road = 1699' A.T. -

A small amount of Moscow was seen in this ravine south west of the road but it was patchy & I did not work it.

Roadside section from fork.

● Road intersection at 1720' A.T.

1720' - 1725' 5" - hiatus

1725' 5" - 1730' 10" - rather soft, dark blue-grey shales with *C. setigenus*^c, *A. umbonata*, *C. boothi*, *C. scitulus*

1730' 10" - 1735' 15" - same kind of sh.

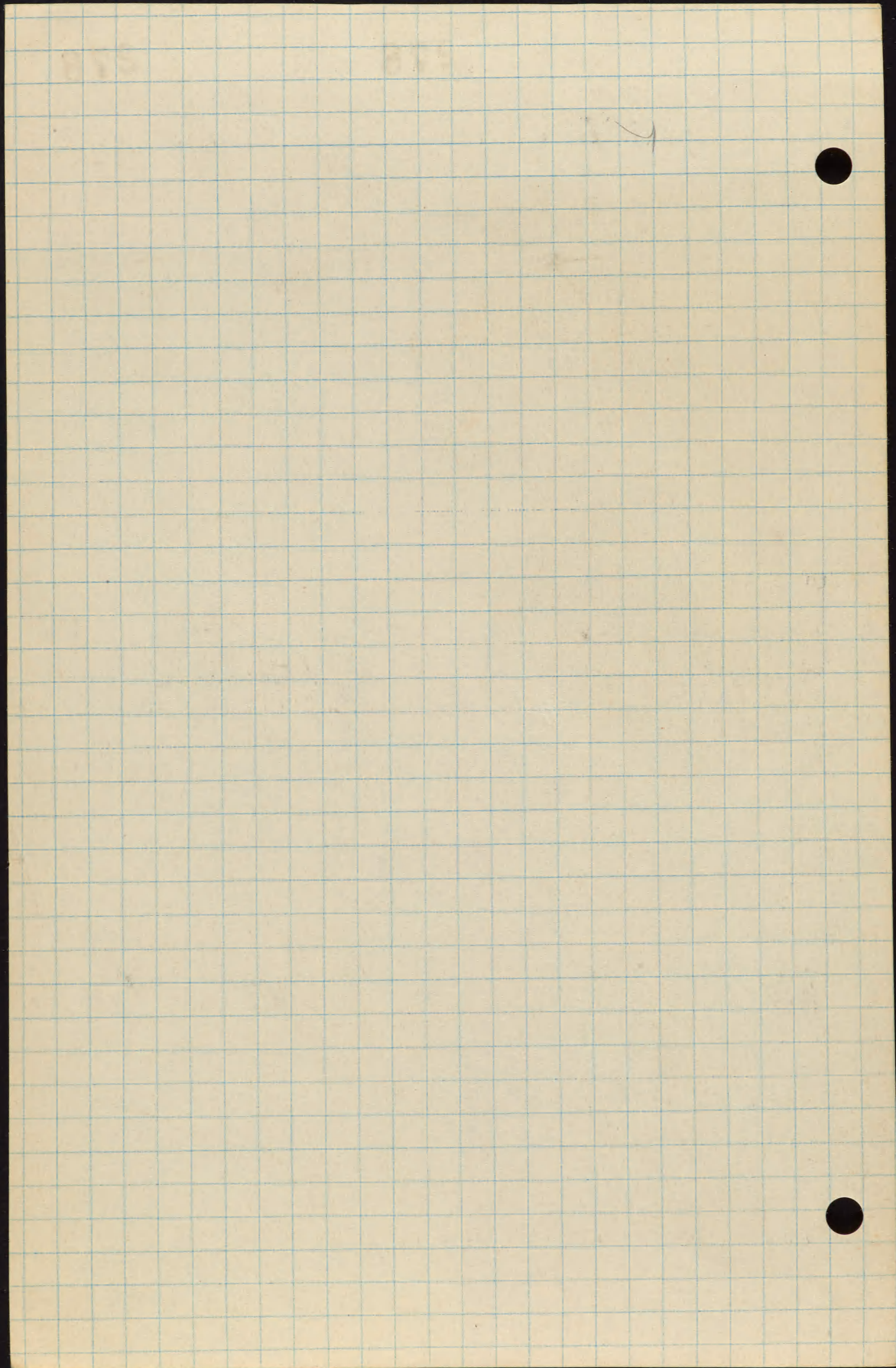
J. submarginata, *S. pennatus*
A. umbonata, *C. scitulus*

These shales fracture into small blocks and on the surface weather to a purple color.

1735' 15" - 1740' 20" - *S. pennatus*^c, *C. boothi*, *C. scitulus*, *N. corbulariformis*, *S. zeplum*, *O. undulata*, *N. trichter*, *C. mucronatus*, *J. submarginata*, *A. umbonata*, *S. capillaris*, *Arriolopecten* sp.

● 1740' 20" - 1745' 25" - similar sh.

N. lirata, *C. scitulus*, *Cyst. harr.*
N. dehayi, *J. submarginata*
C. coronatus, *N. globosa*, *S. pennatus*



C. scitulus is very abundant here

1745' 25" - 1750' 30" -

C. bellistriata c
N. bellistriata
O. carinata
A. umbonata
C. scitulus
N. varicosa
H. dekeyi
Platyceras sp.
S. perplana
R. fimbriata

G. capillaria
P. rana
T. carinatus c.
S. pennatus
Leiopteria sp.
Neplritoceras sp.
Cyt. ham.
C. coronatus
Pterinopecten sp.
Pal. constricta

1750' 30" - 1755' 35" -

M. mytiloides
T. carinatus c
G. capillaria
C. bellistriata
Productella sp.

S. pennatus
A. tetrastulid (*E. lillabai*)
~~*S. per*~~ *Cyt. ham.*
Leiopteria sp.
N. bellistriata

1755' 35" - 1760' 40" - same

1760' 40" - 1765' 45" -

S. perversa
M. concentrica
S. granulosa
Pal. constricta

Leiopteria sp.
A. umbonata
Trigula sp.

1765' 45" - 1770' 50" -

S. granulosa
S. pennatus *S. perversa* (large)
C. uncoronatus *N. triquetra* *Cyt. ham.*
C. scitulus *P. radiatus* *R. wherryi*
A. umbonata *P. rana*

1770' 50" - 1775' 55" -

M. concentrica
A. umbonata
Grammysia sp.
A. serpens
C. tenuistriata
S. perversa c
R. fimbriata

R. vanuxemi
P. rana
S. pennatus
N. liata
C. coronatus
S. granulatus
H. acilis
O. undulata

1775' 55" - 1780' 60" -

A. serpens
S. granulatus
R. fimbriata
C. tenuistriata
C. mucronatus
S. perplana
C. coronatus
A. blastoid
A. crinoid
Par. ham.

M. mytiloides
M. concentrica
S. pennatus
S. crotatum
R. vanuxemi
C. boothii
T. carinatus
A. umbonata ~
D. capillaria

1780' 60" - 1785' 65" -

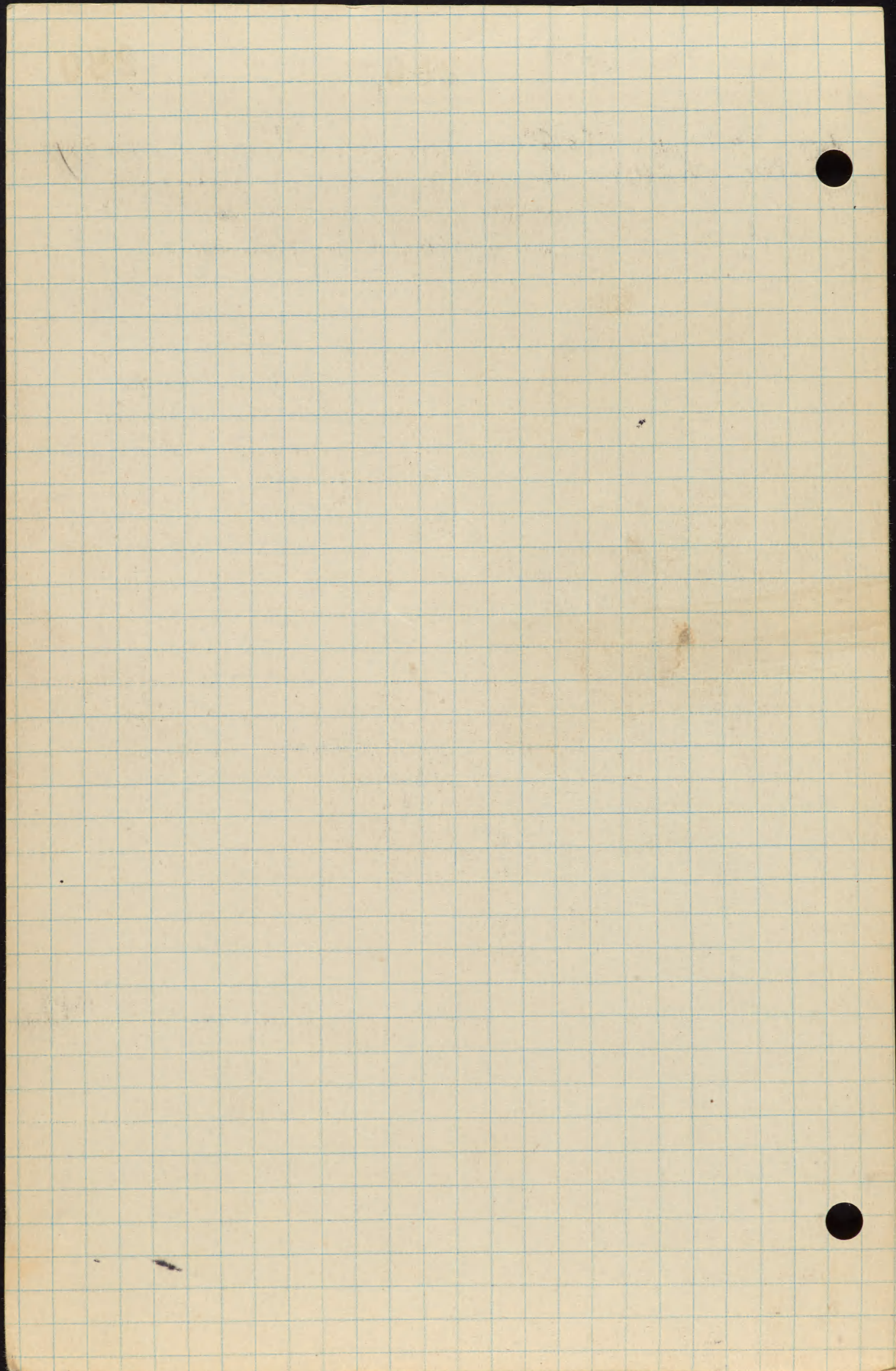
T. carinatus
A. umbonata
S. granulatus

P. oviformis
S. junia
O. undulata

1785' 65" - 1790' 70" - Shales here are weathered to an olive grey. & are mostly unexposed. *P. emarginata*

1790' 70" - 1795' 75" - Very hard rock with *S. pennatus*, *T. carinatus*

1795' 75" - 1800' 80" - The hard layer is exposed for about 2' then comes shales again. with *Grammysia* sp.



1800' 80" - 1805' 85" - The rock on the top of the hill is hard and sandy having abundance of *T. carinatus* and *Tachurus* and huge *Strophodontas* *S. junia*, *S. perplana*,

1805' 85" - 1810' 90" - top of hill
T. carinatus cc
S. perplana
Leiopteria sp.
C. mucronatus
M. concentrica
Cyst. lam.

This shale is sandy and much harder than that below

1810' 90" - 1815' 95" - hiatus
 1815' 95" - 1820' 100" blue grey shales with
A. reticularis, *P. rana*, *Arenulopecten*,
S. pinnatus, *M. concentrica*,
Cystodictya, *Arturacantha* sp.
 1820' 100" - 1825' 105" - *S. pinnatus*, *T. carinatus*
Pal. constricta, *P. rana*, *M. oblongatus*.

1825' 105" - 1830' 110" - wood, *S. pinnatus*,
P. rana,

1830' 110" - 1835' 115" - *S. pinnatus*, *C. scutellus*
M. concentrica, *A. reticularis*

1835' 115" - 1845' 135" - At the top of the hill about 3' of rock is exposed a dark blue grey weathered shale that has fallen to fragments. The shale from 1815' 95" to the top of the hill is all blue grey gritty but rather soft, breaking into thick irregular lumps

Burton's
Ravine

sh. - 3'
Covered 11'

Road
Section

1855' 135

1835' 115

1830' 110

1825' 105

1820' 100

1815' 95"

1810' 90"

1805' 85"

1800' 80"

1795' 75"

1790' 70"

1785' 65"

1780' 60"

1775' 55"

1770' 50"

1765' 45"

1760' 40"

1755' 35"

1750' 30"

1745' 25"

1740' 20"

1735' 15"

1730' 10"

1725' 5"

1720

135
11
145
50
196
40
235

32'

Covered

1685' 165

1680
1685
(30)

1655' 135"

1650' 130

1645' 125"

1640' 120"

1635' 115"

16230' 110"

1625' 105"

1620' 100"

1615' 95"

1610' 90"

1605' 85"

1600' 80"

1595' 75"

1590' 70"

1582' 65" - 1585' 65"

1572' 55"

1582

1557'

Blue grey sh.

Covered

1 1/2 Calcareo

Covered

Coarse sh.

same

sandy sh.

sandy shale

2' sandy sh.

Covered

2' 3"

sandy sh.

ss.

sandy rock

Coarse sh.

Soft sh.

ss.

Calcareo
sh.

5 1/2' Covered

5 1/2' sandy sh.

11' Strophos
soft sh.

7 1/2' Very hard
rock

5 1/2' Mostly Covered

65'

sh soft darkly

covered

1584
1517
65
1582 43
1517
55 55
1582 55
1557
15

282

282

Sept 5,

New Woodstock

84' above highway in ravine. are heavy-bedded ss. for 1 1/2' feet.

Covered 5' 5"

The covered interval is succeeded by soft blue-grey shale 2' passing into ss. In the 2' of shale were seen:-

T. caninatus a

S. pennatus a

Following the shale is heavy-bedded ss. for 9'

L. jureia

T. caninatus

a. granulosa

S. pennatus

C. tenuistria

S. perversa

The ss. is followed by arenaceous shale for 6'

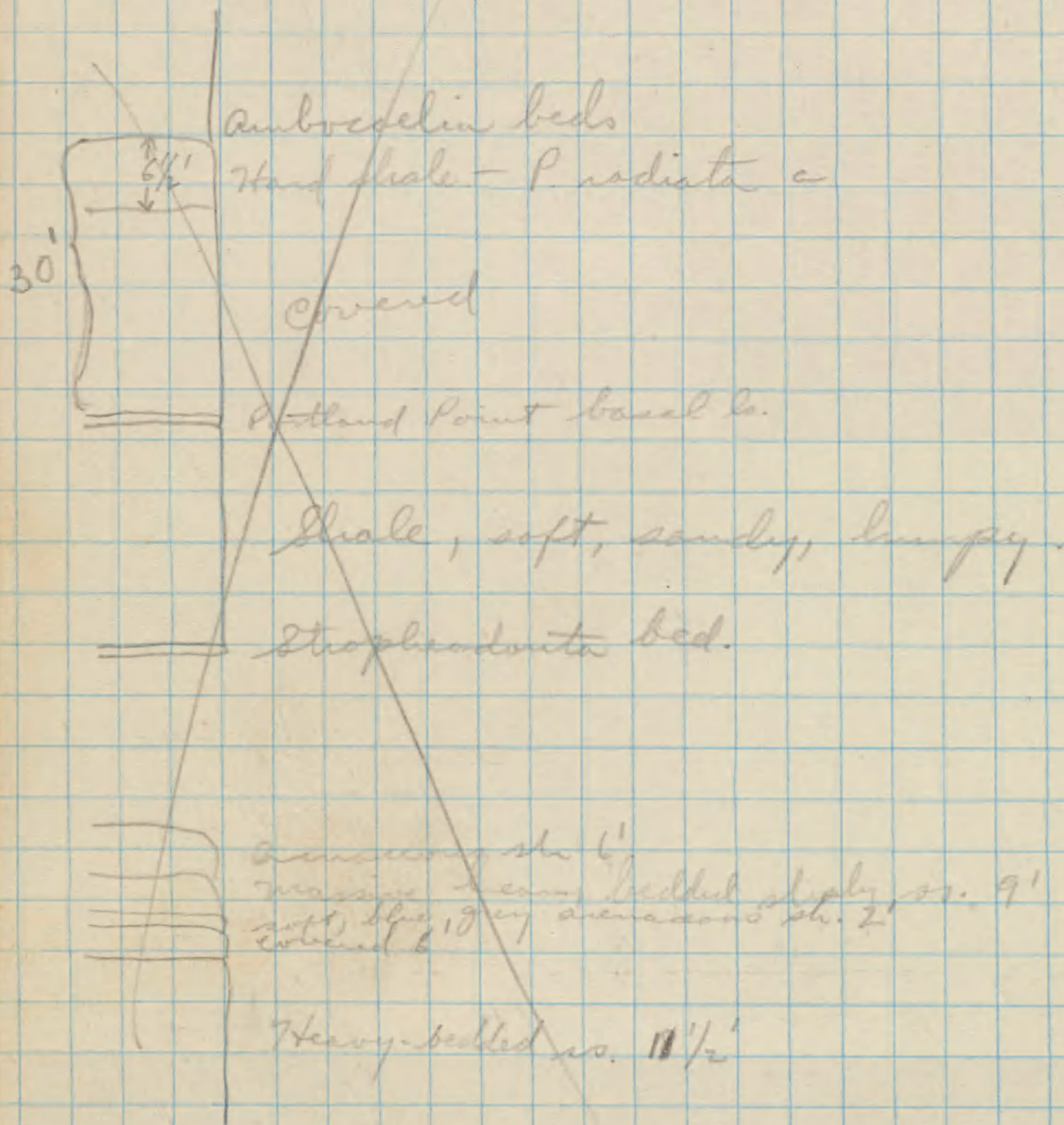
U. oblongatus

H. bellistria

T. caninatus

Section at New Woodstock Ravine

See next page
for section



~~283a~~
J. H. Hunts ravine

Portland Point — Occurs at 1533' above sea level. The basal limy bed is about 6" thick and consists of a limy sandy shale with thin nodules of more calcareous material. *V. pustulosa* is common in the limestone. 30' above the P.P. horizon comes the Ambocoelia beds of the Ovid. Below these at 26-32' above the P.P. were hard massive shales abounding in *S. pennatus*, *P. radiata* and *C. mucronatus*.

Pholidostrophia bed — Fossils.

<i>P. flabellum</i> c	<i>C. mucronatus</i>
<i>M. concentrica</i>	<i>A. granulosa</i>
<i>T. carinatus</i>	<i>A. decussata</i>
<i>S. pinnatus</i>	<i>P. iowensis</i>
<i>L. papyrosa</i>	<i>A. spiniferoides</i>
<i>A. pilosus</i>	<i>P. contracta</i>

The Pholidostrophia bed here is not well-defined but caps a low escarpment over sandy rocks. *P. iowensis* is not as abundant as on the Tully & Shann. sheets.

(cl. H.)

Behind Hunts' farmhouse is a (30' high) exposure mostly in bluish grey arenaceous shales characteristic of the lower Ludlowville.

Fossils:

<i>S. demissa</i>	<i>M. concentrica</i>
<i>A. spiniferoides</i> c	<i>Pch. tenuistriata</i>
<i>S. pinnatus</i> c	<i>A. quadrata</i>
<i>P. flabellum</i>	<i>L. laeva</i>
<i>C. hexagonata</i>	<i>T. submarginata</i>
<i>A. granulosa</i>	<i>S. pinnatus</i>
<i>P. hamperii</i>	

I rose the road at Hunts house to the first exposures in the gully is 70'. This puts the Portland Point basal bed at 1533' above sea level.

Ambocoelia beds + Moscow

8' *Pholadella* bed.

21' covered

U. pustulosa - 5" Portland Point 1533' AT.

arenaceous shale 30'

S. demissa
Heavy-bedded shaly ss.

sandy shale, heavy bedded

27'

44
30

11' covered

arenaceous sh. soft at base 6 1/2'
hard calcareous sandy above

P. iowensis 3"

11' very arenaceous sh at base, heavy bedded ss above 11'
covered 5'

Heavy bedded ss. 11 1/2'
covered. 25'

First exp. in gully

30' blue-gray arenaceous sh.

15' covered
Road

Sept 5'

Bridge is at about 1315' A.T.

Section on L. Creek E. of New Woodstock bridge
 The first rock is in a low cascade 2' high of
 blue gray arenaceous shale culminating in a
 thin layer of harder rock. Fossils are:

<i>S. pennatus</i>	<i>I. cymatus</i>	<i>Schiz. channingensis</i>
<i>C. scitulus</i>	<i>C. boothi</i>	<i>C. setigerus</i>
<i>N. oblongatus</i>	<i>G. bicaudata</i>	<i>C. vicinus</i>
<i>C. mucronatus</i>	<i>G. umbonata</i>	<i>P. patulus</i>
<i>P. fragilis</i>	<i>C. elongata</i>	<i>M. corbuliformis</i>
<i>M. bellistata</i>	<i>G. acuta</i>	<i>P. costata</i>

Above this cascade is another about 2 1/2'
 high in the same material. The shale above
 this cascade becomes harder and ultimately
 a coarse sandy rock. Fossils in the 2 1/2'
 cascade are:

P. costata *O. cymata*

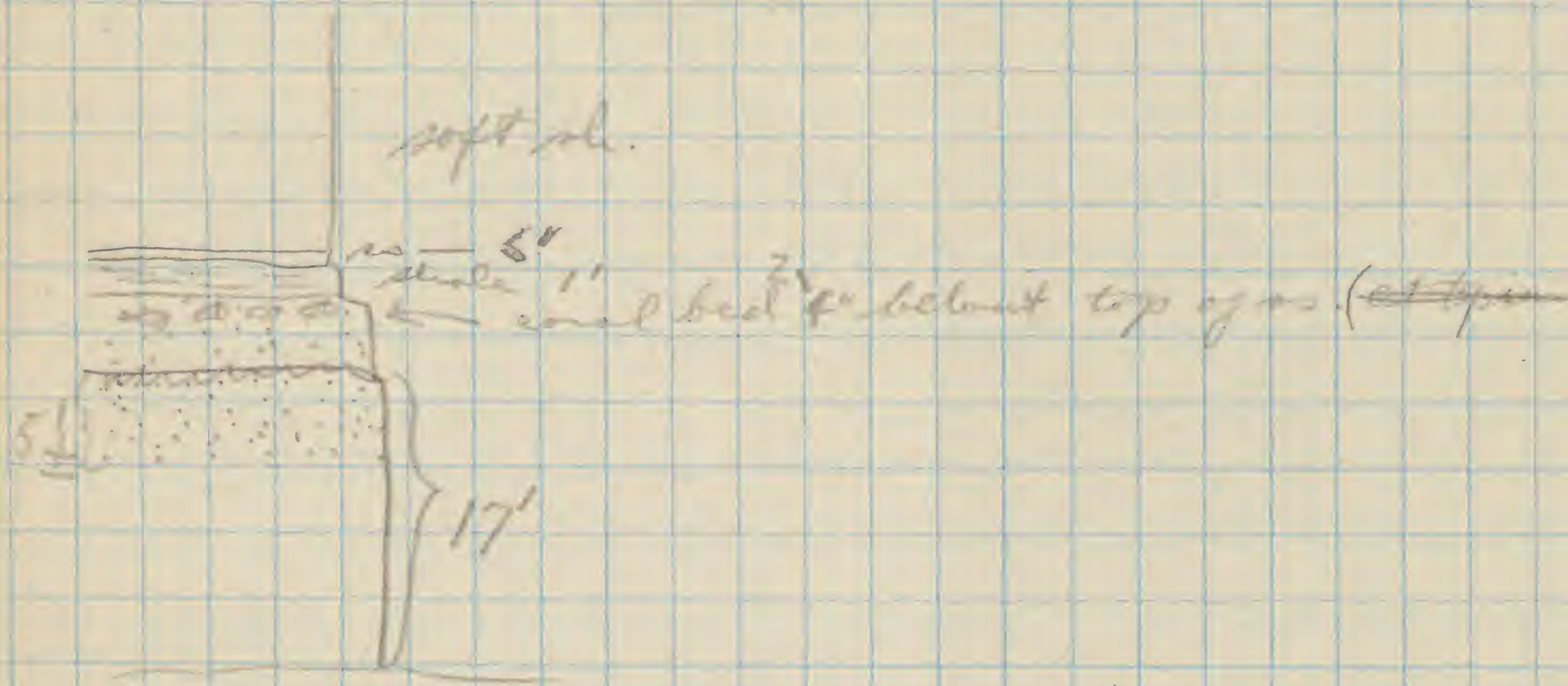
Above this cascade is 18' of rock in a
 falls over at least 3' of coarse shale
 or ss. The top of this falls is at about
 1333' A.T. The top forms a considerable flat
 in the stream. The top bed is calcareo-
 arenaceous and exceedingly hard. Fossil
 seen in the ss. beds are:

<i>S. pennatus</i>	<i>A. spiriferoides</i>	<i>L. juncea</i>
<i>C. coronatus</i>	<i>A. reticularis</i>	<i>E. lillike</i>
<i>A. granulosa</i>	<i>L. perplana</i>	

Above the brink of the falls is about 1'
 of shaly ss. then 10" shale, then a 5" layer
 of ss. followed by soft sh.

Upstream from the brink of the falls
 passes a coral bed is exposed at the
 head of the stream. The top of the falls
 horizon is brought upstream by a faint
 induration so the top is 6' above the
 brink of the falls at present

Section at New Woodstock



The coral bed is in very sandy shale, and is about 6" thick. Other fossils in this bed besides corals are:

<i>S. pennatus</i>	<i>C. bellistriata</i>	<i>A. granulosa</i>
<i>R. fimbriata</i>	<i>Per. ham.</i>	<i>C. coronatus</i>
<i>A. reticularis</i>	<i>Sch. perversa</i>	<i>L. perplana</i>
<i>S. cratulum</i>		

The shale above the 4" sandy bed is soft, blue-grey arenaceous. Crumbles to small chips.

<i>For. ham.</i>	<i>N. triquetra</i>
<i>N. bellistriata</i>	<i>T. subemarginata</i>
<i>C. setigenus</i>	<i>P. fragilis</i>
<i>M. subalata</i>	<i>C. bellistriata</i>
<i>C. congregata</i>	

This shale is only very moderately fossiliferous. The fauna of the sandy rocks not having passed above into the shale. This coral bed may be local but also may represent the tail end of the Vesper reef.

Additional fossils in the ss. are &

C. congregata
M. mytiloides
A. princeps

Coral beds are best exposed 150 paces up stream from brink of falls.

Sept 4.

0-5'5" - barren, dark grey shale. The ravine traversed this day showed only this 5' patch of shale.

Section along the road.

At the road intersection and for 5' above it is little sandy (calcareous) shale with very few fossils. I correlate this rock with the Peppin rock exposed at the m. cut at the tunnel.

1220' - 1225'5" - hard brittle shale, very few fossils.

A. andersoni

H. Clifton

Campanotrichia

1225'5" - 1230'10" - covered

1230'10" - 1235'15" - a small patch of shale at top, like that below.

1235'15" - 1240'20" - mostly covered, but at top a small patch of limestone, no fossils seen.

1240'20" - 1275'55" - At the top of 1225'55" - is the top of the hard sandy layer $3\frac{1}{2}$ - 4' feet thick which appears as a ledge in the cliffs at Delphi falls. Rock has been exposed nearly continuously from 30' above the highway intersection. Above the hard layer the shale is soft but still calcareous to a marked degree. It crumbles into small thick, irregular fragments. This bed contains:

S. curvata

L. luma

The Delphi terminates between 8 & 9 steps above the hard layer at about 1330 A.T. It is well exposed. The sandy massive shale of the Peppin forms the brow of the hill being exposed in the gutter (on west side) of the road. Top of Delphi forms a conspicuous flat at 1330 on the east side of hill - 1330 (or 1320) on west side of hill.

8481

$$\begin{array}{r} 168 \\ 42 \\ \hline 336 \\ 378 \\ \hline 5200 \\ 51200 \end{array}$$

06

The upper part of the Delphi is well exposed as a terrace or flat at 1320'. The sandy beds of the Delphi are about 15'.

Sept. 4.

Section at Knights Falls.

First exposures examined are 167 paces upstream from the junction of Knights Falls brook with the Limestone creek. At the 167th paces is a ten foot cliff of soft grey shale that crumbles to small fragments. The shale weathers to a lighter grey. Fossils are:

<i>A. andacula</i>	<i>I. bellulus</i>	<i>M. pygmaea</i>
<i>A. umbonata</i> c	<i>P. spinulicosta</i>	
<i>C. micronatus</i>	<i>Streptelasma</i> sp.	

Small concretions are common.

167 paces brings to about 915'

915' - 935' 20" - mostly soft shale with the fauna above. At the top of 935' 20" - the shale abounds in *C. micronatus* and also contains a small variety of *I. corinatus*, and *C. congregata*.

935' 20" - 940' 25" - Upper 3' is of hard calcareous, sandy shale containing:

<i>P. rugulata</i> c.	<i>C. micronatus</i>
<i>I. corinatus</i>	<i>Pal. constricta</i>
<i>M. pygmaea</i>	<i>H. dekeyi</i>
<i>Pal. constricta</i>	<i>C. setigerus</i>
<i>Paracyclasliata</i>	<i>C. congregata</i>
<i>O. parvula</i>	<i>M. pygmaea</i>
<i>L. delia</i>	<i>A. andacula</i> (small)

The hard shale (calcareous) continues to 940' 25" - 970' 55" where the shale becomes somewhat softer. The above fauna holds for the 35' of hard shale up to 970' 55". Between 970' 55" and 975' 60" were seen:

Section at Knights Falls.

11' {

49' Shale

massive sandy bed 3-4'

Shale 59'

^{ls.} shale 5' (?) abounding in *T. carinatus*.

Hard calcareous sh. 40'

soft sh abounding in *A. umbonata* &
A. andacula

Pal. constructa
A. princeps
C. mucronatus

T. carinatus c
M. concentrica
C. coronatus

975' 60" - 980' 65" - Lower two feet covered
 upper 3' of a soft sometimes liny shale
 abounding in fossils, especially *T. carinatus*
 Fauna in these lower shales are:

<i>T. carinatus</i> a	<i>C. indenta</i> re	<i>Stannysia</i> sp. r
<i>B. sulcomarginata</i> re	<i>C. vicinus</i> re	<i>A. decussata</i> re
<i>Pal. constructa</i> re	<i>H. dekeyi</i> r	<i>P. flabellum</i> re
<i>M. oblongatus</i> re	<i>M. concentrica</i> re	<i>C. bopthi</i> re
<i>C. scitulus</i> r	<i>Cran. ham</i> r	<i>P. lirata</i>
<i>O. parvula</i> r	<i>Par. ham</i> r	<i>M. subolata</i> re
<i>P. sectifrons</i> re	<i>C. mucronatus</i> re	<i>P. hermes</i> re
<i>A. princeps</i> r	<i>P. spinulicostae</i>	<i>P. radiata</i> re
<i>M. pygmaea</i> r	<i>P. lirata</i> re	<i>P. iowensis</i> re

On top of this sh. is a kind of shaly ls.
 abounding in crinoid stems and having
 the following fossils:

<i>P. flabellum</i> re	<i>M. concentrica</i>
<i>R. vanuxemi</i>	<i>C. mucronatus</i>
<i>L. macroptera</i>	<i>A. decussata</i>
<i>P. sectifrons</i>	
<i>A. bulbosus</i>	

980' 65" - 985' 70" - succeeding the ls. is a soft
 shale having in the first 2 feet: -

A. umbonata
R. vanuxemi
C. mucronatus
Cyrtina ham.
L. perplana
C. bopthi
C. indenta
P. rana
P. iowensis
P. discoidum

6" 1095 21 1105

These lower 2' are like the l. below in part but in the upper 3 they become very soft sh. with many small concretions.

985' 70" - 990" - 75" - lower 2' covered. Upper 3 1/2' like the shale at bottom of falls at Delphi.

Pal. constricta
C. mucronatus
A. umbonata
P. punctifera

C. scitulus
P. perplana
Lox. Thronttoniae
B. sulcomarginata

There are 4 steps from the hard layer to the base of the falls, at 1000' 85". About 1' up from the base of the falls. *Pholidops* is abundant, its exact range however was not determined. Top of 1st falls is at (base of sandy bed) 1035' 120". The sandy bed is 38' above the base of the first falls or 59' above the calcareous bed (Mottville). The top of the second falls is 8 steps above the hard ledge, and the top of the Delphi is at 9 steps. The bridge comes at 11 steps. This gives 49' for the rock above the hard sandy bed. The ss. at the top is calcareous, marked by *Troncyus* & is 11-15' thick.

The top of the Pecksport on the Casanova quadrangle appears to be the Mottville, making thus, the Cardiff much thicker than before suspected.

1705
1442
263

289a

Sept 9¹

On hillside behind Paynes house at 1688' A.T. were very sandy rocks belonging either to the Portland Point or uppermost Ludlowville. Undoubtedly Moscow occurs about 20' above these exposures.

Sept 9²

<i>P. maxima</i>	<i>P. flabellum</i>	<i>S. pennatus</i>
<i>A. granulosa</i>	<i>A. andacula</i>	<i>C. scutellus</i>
<i>C. tenuistriata</i>	<i>C. bellistriata</i>	<i>H. dekaigi</i>
<i>A. spiniferoides</i>	<i>A. princeps</i>	<i>Platystrophia</i> sp.
<i>A. reticularis</i>	<i>S. demissa</i>	<i>M. concentrica</i>
<i>T. cuneatus</i>	<i>P. oviformis</i>	<i>L. per plana</i>
<i>Schiz. channingi</i>	<i>Tarbellus</i>	

Ludlowville which I believe to correlate with the Demissa zone 27' below the P.P. at Fabius. Undoubtedly Moscow was seen at 1520. The exposures of Ludlowville in the stream are 1480' downstream from crossing under V.R. reaching them at about 1480' A.T. The P.P. would then come at about 1507' A.T. giving about 249' for the Moscow. The rock exposed in the stream is calcareo-arenaceous and is succeeded by 5' of softer sandy shale. Collecting is excellent.

P. Point at Days is 1442' and gives for the Moscow a thickness of 263'.

3/4 mile SW of rd. intersection at
SW end of Hatch Lake.
Sept 9.

Fauna in Portland Point member

<i>V. pustulosa</i> re	<i>E. lincolniensis</i>	<i>S. genivosa</i>
<i>P. emarginata</i>	<i>R. cyclops</i>	<i>Conocardium</i>
<i>R. variegata</i>	<i>C. lam.</i>	<i>H. canadensis</i>
<i>L. perplana</i>	<i>I. cuneatus</i>	
<i>A. decussata</i>	<i>C. bellistriata</i>	
<i>S. pennatus</i>	<i>S. tullius</i>	
<i>H. deparis</i>	<i>P. ionensis</i>	
<i>P. rana</i>	<i>Sch. arctostriata</i>	
<i>P. spinulicosta</i>	<i>Cup coral</i>	
<i>A. granulosa</i>	<i>R. grandis</i>	

The Portland Point consists of about 2' of sandy shale and calcareo-arenaceous rock abounding in fossils. About 20' above it occurs the top of the *Pholadella* beds. The exposure is poor but valuable. The gully into the P.P. is located 600 paces south of the house on the west side of the road, which is the first habitation south of Hatch Lake. At the roadside is cross-bedded ss. & shales which must lie about 10' below the *Pholidostegia* bed. The Portland Point is 18 steps (98') above the road level at about 1500' putting the Portland Point at 1598' A.T. 21' below the P.P. the rock was hard sandy stone.

$$\begin{array}{r} 1756 \\ 1507 \\ \hline 249 \end{array}$$

Lud. Shear. Contact.

Sept 10'
NNE of Nelson

Hand levelling begun at about 1455'. A.T.

1455' - 1550' 95" - covered

1550' 95" - 1555' 100" - ~~bluish grey ss. without fossils~~
Greenish grey arenaceous shale, fossils rare
L. laura

1555' 100" - 1560' 105" - Arenaceous shale,
bluish grey, rusted:

L. laura & *Spermatus*

C. vicinus

A. boydi

1560' 105" - 1585' 110" - The shale is directly
succeeded by a 3' bed of hard grey ss
quite massive, and is followed by 2 1/2'
of arenaceous shale like that below.
L. laura is common in the 2 1/2' of sh.

1565' 110" - 1570' 115" - arenaceous shale.

L. laura.

1570' 115" - 1575' 120" - same shale: fossils rare
L. laura

1575' 120" - 1590' 135" - shale becoming gradually
coarser, breaking into thick pieces. In
places it is essentially a ss.

1590' 135" - 1595' 140" - lower 2' slabby sand
shale, upper 3' slabby, crossbedded ss.

1595' 140" - 1600' 145" - thin ss; and arenaceous
shales, former predominant.

1600' 145" - 1610' 155" - same, *P. fragilis*
seen in a thin layer of sh.

1610' 155" - 1615' 160" - most coarse arenaceous
shale. *N. triquetra*

1615' 160" - 1620' 165" - most coarse shale

1620' 165" - 1620' 170" - mostly thin platy ss.
C. immanus

$$\begin{array}{r}
 1655 \\
 17 \\
 \hline
 1672
 \end{array}$$

$$\begin{array}{r}
 1672 \\
 17 \\
 \hline
 1655
 \end{array}$$

1620' 170" - 1625' 175" - mostly covered but a small patch of ss has:

P. flabellum *A. granulosa*

1625' 175" - 1630' 180" - mostly slabby ss.

C. congregata

P. flabellum

1630' 180" - 1635' 185" - coarse sh & slabby ss.

P. flabellum

1635' 185" - 1640' 190" - cross-bedded ss, arenaceous shale.

1640' 190" - 1645' 195" - mostly platy ss & coarse shale. Ripples on the ss.

1645' 195" - 1650' 200" - covered.

1650' 200" - 1655' 205" - top 2' in cross-bedded ss.

On top of this ss. is an arenaceous shale containing:

Trochus:

P. emarginata *R. vanuxemi*

Goniatites

D. inaequistrata *A. seipens*

S. sculptilis

L. perplana

C. congregata

A. decussata

D. carinatus

Cup corals

1650' 205" - 1655' 210" - The foot of coarse shale is at the base & at the top is

6" of arenaceous shale. The intervening rock is covered. Fossils in the 1/2' of sh are:

D. carinatus

A. granulosa

L. perplana

S. pennatus

C. coronatus

Blindophyllus

R. fimbriata

A. spiniferoides

C. congregata

S. sculptilis

N. coriacea

A. reticulata

P. macrocephalus

A. decussata

C. congregata

P. constructa

R. vanuxemi

1655' 210" - 1665' 220" - covered

1665' 220" - 1670' 225" - all covered but 6"

arenaceous sh. in middle of interval yielding

Trochus

A. decussata

D. carinatus

S. pennatus

Goniatites

L. capillaria

165
16
16

245
205

1670' 225" — 1680' 235" — covered

1680' 235" — 1685' 240" — small exposure

2 or 3' in gully of arenaceous sh.

Coarse, sandy weathered to greenish grey

1685' 240" — 1690' 245" — Hard arenaceous rock
Fossils are:

A. spinifrons

C. congesta

A. beclusata

Leptopteriles sp.

P. fragilis

J. carinatus

Rock extends for about 2' beyond this interval being calcareo-arenaceous in thin layers mixed with shale layers. This forms a conspicuous flat between the two hills which the ravine divides.

The rock above the cross-bedded ss abounding in *S. sculptilis* is calcareo-arenaceous, altho it breaks into irregular slabs like shale.

95
107

26

100

Aug 31.
Ogdenovia sheet

Hand levelling begun at 810' at bridge & highway intersection. 32' above bridge is an 8' exposure of the Marcellus shale.

In the main stream between 15 & 16 steps above the bridge the shale no longer has the brown streak but has a white streak. The transition from the Marcellus to the Cardiff must come at about 894' above sea level.

The streak of the shale between 14 & 15 was lighter brown than below them. Between 22 and 24 was seen fissile blue-black shale having a white streak. A goniatite was the only fossil noted. From 22 on exposures have been good and are nearly continuous. At 26 were found:

L. laura

Obolobriden

At 13 comes a fork in the stream. The following data is from the right or east fork. The right branch was followed to 42 steps or 1038' A.T. and above. Blue-black, unfossiliferous Cardiff shale for the whole distance.

This ravine was hand-leveled up to 80 steps.

practically to the horizon in which the tunnel is located. Hand leveling back the following was seen:—

31-79 = shale, without bedding, crumbling to lumpy pieces, soft arenaceous fossils are not abundant:

S. crataegus
C. mucronatus or
L. perplana or
P. biphidicosta
S. parvatus
A. laudacula
L. opteria
Acinulopora

L. eriger
A. carbonata
L. laura or
Schiz. Chemungensis
L. laura
P. biata

79-77- coarse shale, sandy, irregular fracture, abundant in *A. andacula*.

S. pennatus r
C. mucronatus
A. umbonata
L. perplana

S. crotalum
M. concentrica
Macrocheilus

77-76"- The shales in this interval are much softer and crumble to small pieces

P. spinulicosta
L. laura
P. flabellum
A. andacula c

A. umbonata
H. randalli

76'-75"- shale softer (perhaps). All of this shale has a purplish cast to it when weathered.

A. andacula a
P. rugulata

Pelecypod.
L. perplana

75-74"- Same soft crumbly sh.

A. andacula c
S. pennatus r
L. perplana
H. oblongatus

C. setigerus
C. mucronatus
P. rugulata
A. umbonata

74-72"- same - Fossils less abundant

72-70"- *A. andacula* disappears at the base of 72. The shale of this interval is very soft crumbly & is like the typical Cardiff. Fossils are rare:

H. oblongatus
H. trigaster
A. umbonata
L. laura

S. pennatus
C. setigerus
Orthoceras sp.

1927

Sept 27.

1525' A.T. small exposure Delphi
C. coronatus *S. peruviana*
P. flabellum *A. boydi*
O. olivacea

Sept 27²

1800' - 1850' 50" - a patch of Genesee about
 10' above 1800' at road. Between 1850' 50"
 & 1855' 55" - soft grey shale that
 must belong to the Sherburne.

The Sherburne is exposed as far up
 this ravine as far as 1957' A.T. It
 is an alternating series of thin ss.
 slabs and bands of soft grey shale.

From the bottom of the Tully here
 to the road is 5' and from the road
 to the first exposed Genesee is 5' ±
 This would put the Tully between
 these two. A few Tully blocks were seen
 in a gully across the abandoned road.
 Actually about 3' of a shaley ls is
 exposed.

Actual Genesee is exposed
 for 40' above the road in patches.
 Blue must be about 50' of this
 stone. It is here rather blue
 when weathered and is fairly
 gritty.

The Hypothyris layer is not here
 as no granular ls or no fossils
 were seen. The distribution of
 Tully blocks suggests a thickness
 of ten feet for the Tully.

980

$$\begin{array}{r} 4 \\ 20' 20'' \\ 110 \\ \hline 133 \\ 11 \\ \hline 1441 \end{array}$$

$$\begin{array}{r} 980 \\ 144 \\ \hline 1124 \end{array}$$

$$\begin{array}{r} 994 \\ 119 \\ \hline 1113 \end{array}$$

18 steps up creek, 325 paces
downstream from house near ^{stream-}crossing

The Tully here is on the Pitcher Quad and is in the west branch of Otsego Creek at 1478' A.T. It is a beautiful exposure. *Hypothyris* was seen abundantly in the bottom layer. The map indicates a thickness of 15-17'.

According to what the Cardiff would come in at about 1100' A.T. I believe this is too thin.

Large septaria, like those of the Marshallus were seen about 40' up in the Cardiff from the base.

$$\begin{array}{r} 1080 \\ 960 \\ \hline 120 \end{array}$$

$$\begin{array}{r} 1102 \\ 960 \\ \hline 142 \end{array}$$

$$\begin{array}{r} 1125 \\ 960 \\ \hline 165 \end{array}$$

$$\begin{array}{r} 981' \\ 20' \\ 3' \\ \hline 110 \end{array} \quad \begin{array}{r} 20'' \\ 110 \\ \hline 130 \end{array}$$

$$\begin{array}{r} 981 \\ 110 \\ \hline 1091 \end{array}$$

0 130'
54'
76'

Sept 6.

1295
76
1220

Lowest rock exposed in ravine is 15' of coarse, massive, arenaceous shale abounding in *L. laura* and having also *P. fragilis*. This is the Randallville shale.

0' - 10' 10" - Coarse arenaceous shale abounding in *L. laura*

10' 10" - 25' 25" - covered

25' 25" - 30' 30" - Massive bluish arenaceous shale that strongly resembles the Red Gate *L. laura* a.

At the top of this interval the following were seen:

L. laura a *N. arguta* a
P. liata c *C. congregata*

The shale at the bottom of this step was dark gray but at the top it had a distinctly bluish color.

30' 30" - 35' 55" - same shale

L. laura c *C. congregata*
L. propeta *G. missouriensis* sp.
C. micromatris *P. liata* c

35' 55" - 40' 40" - Shale mostly same but has a few thin flinty ss. layers. *L. laura* abounds thru the whole interval in large forms. *P. fragilis*

40' 40" - 45' 45" - massive sandy shale, blue green and thin ss. *L. laura* *P. liata*

Upper 2' covered.

45' 45" - 50' 50" - lower 2' covered - Upper 3 1/2' found of rock:-

Bluish gray sandy shale:

I. carinata *A. andacula* *C. congregata*
C. vicina *T. annua* *G. missouriensis*
P. stricta *P. rectifrons* *C. bellistriata*

Cap coral	<i>S. sculptilis</i> n	<i>Orn. ham.</i> n
<i>L. solenoides</i> n	<i>R. vancouveri</i> n	<i>A. reticularis</i> n
<i>C. mucronatus</i> n	<i>A. granulosa</i> n	<i>L. perplua</i>
<i>P. emarginata</i> n	<i>S. pennatus</i> n	<i>P. tenuistria</i>
<i>P. costata</i> n	<i>M. concentrica</i> n	<i>Sch. channingi</i>
<i>N. conium</i>	<i>M. pygmaea</i>	<i>P. sana</i>
<i>D. macquarta</i>	<i>L. junia</i>	

Lithologically and formally this rock strongly resembles that of the Eschelle shale. This horizon may well be above the Centerville or it may be the first of it although nowhere I seen shale like this at that horizon.

58'50" - 55'55" - mostly covered.

Upper 2 1/2' in blue-gray sandy shale.

I. crinitus n *R. vancouveri*

55'55" - 50'50" - covered

50'50" - 40'55" - hard massive shaly ss.

C. mucronatus *S. pennatus*

A foot below the top the rock is calcareo-arenaceous but is succeeded by equally sandy rock.

40'55" - 30'50" - rock shaly but mostly the same.

30'50" - 25' - 20' - blue gray shale.

25' - 20' - 15' - 10' - bridge. Bridge is at 1295'.

Handlevelling from bridge at 1295' - 1295' 32' up fossils are abundant in the bluish gray shale.

S. pennatus n

L. larva n

I. crinitus

T. submarginata

S. denissae n

M. concentrica

A. spiriferoides

R. vancouveri

C. setigerus

This is apparently the same horizon as behind E. H. Hunt's farmhouse.

Section of Sept 6.

Ord sh.

hard shale 9"

soft shale 16' } *Pholadella* bed.

shale 7'

Portland Point basal bed 2'

1585

sandy shale 25'

A.

crossbedded ss (5')

coarser sandy sh 28'

B

coarse sand sh & ss. 11'

Pholadostrophis bed 1'

cross bedded ss 4 1/2'

coarse shale

C

D 125'

sh, sandy sh
& ss.

1395

20

1585

65

1220

305

9 1/2

121 1/2

12

190

Road at 1395' AT.

11' covered

blue sh 2' *L. laura* c

9' covered

blue grey sh. 6'

Hard sandy rock 6'

L. laura
C. bellistincta
Fossils rare

28

125

153

64

217

267

27' covered

23

sh 2'

covered 3'

sh 3'

5' covered

115

10

125

coarse sh with
L. laura

Lowville

level of bridge is at 1585' PP is at 1485'

The basal member of the Portland Point comes at 35 paces above the bridge or at 1585' A.T. c. l. is 2' thick mostly ls. It is succeeded by about 7' of shale capped by a 6" calcareous bed. In places the shale is calcareous in the form of lentils, and are very fossiliferous. Fossils seen in the shale & ls. above the P.P. basal bed are:

<i>C. micrantha</i> c	<i>C. coronatus</i>	<i>S. pennatus</i>
<i>I. carinatus</i> c	<i>R. vanuxemi</i>	<i>L. papillata</i>
<i>S. pennatus</i>	<i>A. granulosa</i>	<i>J. acurata</i>
<i>E. lincolni</i>	<i>C. boothi</i>	

The soft shale above the P.P. abounds in *S. pennatus*.

In the hard shale layer at the top 9"-1" were seen:

<i>P. radiata</i> a	<i>M. bellistriata</i>	<i>M. pygmaea</i>
<i>L. delia</i>	<i>C. setigerus</i>	<i>S. channing</i>
<i>S. pennatus</i>	<i>L. ellipticus</i>	<i>A. granulosa</i>
<i>O. undulata</i>	<i>C. boothi</i>	<i>C. coronatus</i>
<i>A. spiniferus</i>	<i>B. arcuata</i>	

In the shales below this layer were seen:

<i>I. carinata</i>	<i>S. pennatus</i> a	<i>I. carinata</i>
<i>P. radiata</i> a	<i>S. arcuata</i>	<i>P. papillata</i>
<i>C. aciculus</i>	<i>C. boothi</i>	<i>M. truncatus</i>
<i>M. pygmaea</i>	<i>P. hennesi</i>	<i>A. spectum</i>
<i>M. bellistriata</i>	<i>P. venturinus</i>	<i>P. capillaris</i>
<i>B. leda</i>	<i>B. brevicata</i>	<i>B. carinata</i>

For 6 or 7' above the P.P. *S. pennatus* & *I. carinata* are abundant & at about 6 or 7' *P. papillata* comes in in ~~small~~ abundance temporarily. *I. carinata* is abundant for only about 10'. Small black concretions are not uncommon at the top.

$$\begin{array}{r} 680 \\ 530 \\ \hline 1210 \end{array}$$

310

19

0

S. tullius is common in a small calcareous patch a short distance below the top layer. No characteristic (or any other kind) *Stromatolites* reaching 5' were seen in this 16' of shale and this would constitute an important difference between this rock and the shaly Portland Point.

Fossils seen in P.P. limy bed (basal bed)

<i>A. campenii</i>	<i>T. carinatus</i> c	<i>S. tullius</i>
<i>C. impressa</i> ?	<i>S. pennatus</i>	<i>H. dekaeji</i>
<i>C. elongata</i>	<i>C. cornuta</i>	<i>P. rana</i>
<i>L. palpebra</i>	<i>V. pustulosa</i>	<i>M. concentrica</i>
<i>C. pennatus</i>	<i>S. pennatus</i>	

V. pustulosa was found on the top & bottom of the bed. This locality is excellent for the Portland Point as it outcrops in the field as well as in the gully.

Fauna in A.

<i>S. pennatus</i>	<i>A. granulosa</i>	<i>A. princeps</i>
<i>T. carinatus</i>	<i>T. carinatus</i>	

Fauna of A. is well known from ravine south of Ashins

Fauna of B. -

Top bed is calcareous - arenaceous:

<i>S. tullius</i>	<i>S. demissus</i> c	<i>A. spiniferoides</i>
<i>S. pennatus</i>	<i>T. carinatus</i>	<i>P. flabellum</i>
<i>M. concentrica</i>	<i>A. granulosa</i>	

In the ss. for 15' below top -

<i>T. carinatus</i>	<i>H. dekaeji</i>
<i>S. pennatus</i>	

About 15' from the top the rock is softer. The cross bedded ss. extends for about 5' from 3' below the top.

Fossils in the softer rock are:

S. pennatus

N. trigonatus

H. arduata

P. flabellum

T. carinatus

C. setigens

C. tenuistriata

P. radiata

P. lanceolata

Taonurus

Fauna in C. —

Taonurus

S. pennatus

A. erectum

T. carinatus

P. patulus

P. modicostata

A. princeps

C. coronatus

C. setigens

C. bellistriata

M. concentrica

N. bellistriata

C. tenuistriata

G. capellina

N. trigonatus

N. oblongatus

P. discoides

L. gabbi

S. solenoides

P. flabellum

A. granulosa

C. forms an 11' fall

B. forms cascades.

A forms a 20' fall over the Portland Point

Fossils seen in *Pholidostrophia* bed: —

P. iowensis

M. concentrica

T. carinatus

A. granulosa

L. perplana

S. pennatus

I believe the hard sandy rock at the top of the section downstream from the bridge represents the same rock as exposed at New Woodstock but the coral beds were not seen.

$$\begin{array}{r} 1140 \\ 130 \\ \hline 1310 \end{array}$$

$$\begin{array}{r} 1340 \\ 90 \\ \hline \end{array}$$

$$\begin{array}{r} 1160 \\ 70 \\ \hline 1230 \end{array}$$

$$\begin{array}{r} 65 \\ 5 \\ \hline 70 \end{array}$$

$$\begin{array}{r} 1440 \\ 120 \\ \hline 1346 \end{array}$$

$$\begin{array}{r} 75 \\ 75 \\ \hline 150 \end{array}$$

Sept 82

The thin calcareous layer at the (1' below) top of the Randallville was noted 95' below the Highway with about 5-7' of sandy sh. below it. In the layer were seen:

A. decussata *C. mucronatus*

M. arguta

P. flabellum

Sept 83

Road Cut

0' - 5'5" - Coarse grey sandy shale

S. pennatus a
L. purplana
C. tenuistriata

M. concinna
C. spiniferoides
H. canadensis
L. junia
C. coronatus
Taormus

P. flabellum
M. alta
S. demissa

5'5" - 10'10" -

S. pennatus a
A. spiniferoides

P. flabellum
C. mucronatus

10'10" - 15'15" -

P. flabellum
S. pennatus

A. erectum
N. liratum
Liliu channingensis

At about the top of 15'15" the shale is very hard and sandy. The next step begins in softer shale abounding in

fossils:

L. junia c
S. demissa c
R. vanuxemi
T. carinatus
L. pennatus

A. reticularis
A. spiniferoides c
Cyrt. thom.
W. oblongatus

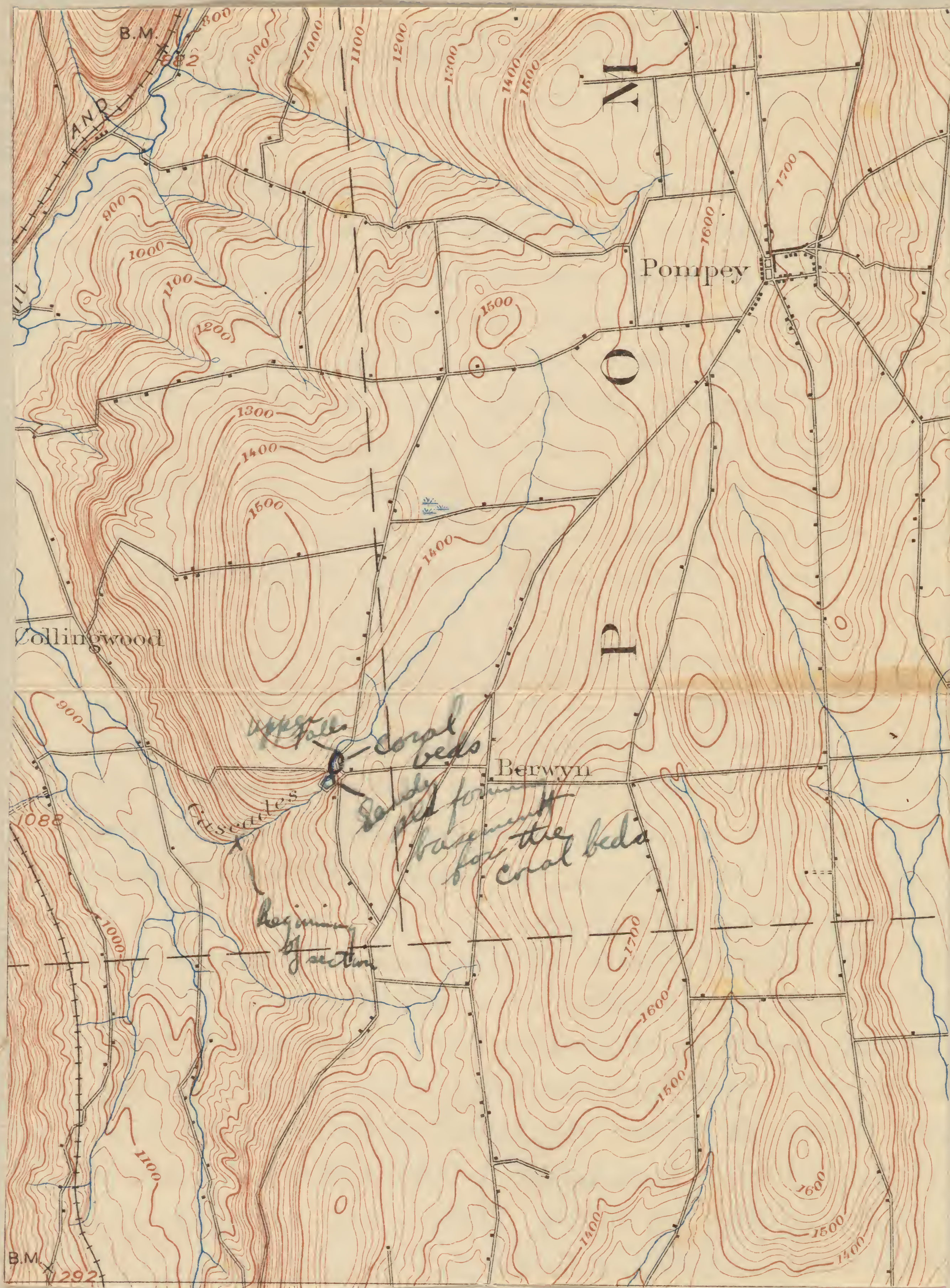
S. demissa ranges thru the whole
 5'.

15' 15" - 20' 20" - mostly covered.

20' 20" - 25' 25" - covered

25' 25" - 35' 35" - covered

305a



Tully quad.
Aug 27, 1928

1928

Aug 27.
 Conklin Falls. = (The Cascades)

0'-5'5" - crumbly blue-grey shale, typical Iowan.

*M. pygmaea**M. oblongatus**P. rana**C. abbreviatus**A. umbonata**S. pennatus*

5'5" - 10'10" - covered

10'10" - 15'15" - dark, fairly uniform shale. It is difficult to tell from this shale if it is the Red Ballville, or below the Red Ballville. It breaks into thin plates & in places is more sandy than usual in the Red Ballville. It makes nearly vertical cliffs & has a square-joint effect.

15'15" - 20'20" - shale

20'20" - 25'25" - 30'30" - to base of falls, mostly covered.

30'30" - 50'50" - First falls - over a massive and argillaceous shale, very sparse in fossils. There is a slight contoured effect and in every way resembles the lower part of Fellows Falls. Fossils seen at the top of the first fall are:-

*P. fragilis**P. rana**M. corbuliformis**S. subulatum**A. umbonata**L. laevis**C. curta*

50'50" - 90'90" - This brings us to the base of the Upper Cascade. There are three canchals. Fossils seen at the top of 90'90" and for 5' above are: none. The rocks are of thin sandy shales breaking into plates just like those of the Red Ballville. Above the Upper bed, producing a contoured effect when weathered. Thin beds of hard ss. are also common. The striking thing about these shales is their hardness.

90' 90" - 135' 135" - same shale - About 10' below the top of the upper cascade *L. laura* was abundant. This is clearly very Rendellville shale and the mapping of it as Bonastiles by Chubb & others according to their own globe is wrong. I took the top of the falls for about 10' from the brink where the gully flattens slightly. The falls is held up by somewhat of a sandy shale than that below. *L. laura* is common at the brink of the falls or 10' back in the hard sandy shale that forms the ledge.

135' 135" - 140' 140" - same sandy shale *L. laura* a. Here begins another cascade and falls. The bottom of the 4th or last falls is at about 140' 140". The there is 1st a cascade of about 15' leading to the base of this last falls.

140' 140" - 150' 150" - same

150' 150" - 155' 155" -

L. laura (very large)
L. submarginata

155' 155" - 160' 160" - 170' 170" - same. At the top of 170' were

M. oblongatus *M. lugubris* *S. pinnatus*
The rock is distinctly coarser and sandier here.

170' 170" - 175' 175" - shale a bit softer
P. fragilis *S. pinnatus*
P. fragilis *C. brachygnathus*

175' 175" - 180' 180" - rock is very coarse, breaks into thick irregular pieces.

S. perrinites La *C. curta* n.

M. triquetra

This must be near the contact of the Centerville & the Ronaclawville

180' 180" - 185' 185" - no fossils were found in this part of the falls except one doubtfully referred to *M. alberta*. The rocks here are very coarse and clearly belong to the Centerville.

185' 185" - 190' 190" -

Lept. clausenensis

190' 190" & 195' 195"

195' 195" - 200' 200" - Top of falls the upper part of the Centerville is clearly a ss but the cross bedded layers like those at Fellows falls were not marked. If the thickness of the Centerville be taken to be 32' and if coarseness is used it would be essentially the same.

Fossils seen in loose slabs of the Centerville are -

Camarotoechia

L. planus

S. perrinites

P. flabellum

The top is hard calcareo-siliceous rock, very resistant and some thin bedded ss.

2

Corbairia Falls



8'

coal beds 7'

52'

Centerfield 32'

Above the Centerfield is blue-gray
arenaceous shale of the Eastville.

A. reticularis

L. pennatus

M. concentrica

A. granulosa

M. mytiloides

L. purpurea

L. jussia

P. puma

R. fimbriata

A. decussata

C. corrugata

T. crinitus &

T. exigua

P. undigata

R. valmyensis

P. stylorum

G. aridhaula

M. concentrica

R. penelope

A. spiruloides

Cup. edulis

Clam. ham.

It was 6 steps from ridge falls to bridge, 55 to top ^{ridge falls}

52' Above the Centerfield is another
falls about 12 feet high north of hard
sandy shale & so for 8'. This is the
same as at Hollow Falls. Above this
comes the corals bed, then a fall of
about 8' over hard sandy rock. ^{characteristic}
~~the corals beds to be about 5' thick~~

Between the top of the sandy shale and
the top of the coral beds is about 7'. The
corals occupy at least the upper 5' of
this 7'. The lower contact could not
be observed.

Additional fossils in shale above
Centerfield:

S. divaricatus

C. elongata

C. scitulus

G. undulata

Par. ham.

Additional fossils in Centerfield

*A. deussata**Daonurus**S. perrinites**S. perrinites**C. undulata**C. undulata**E. perrinites**R. cyclops**C. boothi**J. carinatus**A. reticularis*

The *S. perrinites* are not the extremely transverse, domed like in the *U. deussata* but the *P. perrinites* are the commoner kind. Small concretions are common in the upper layers.

No *Porphyro* beds were seen anywhere in this vicinity hence *Obolus* may be wrong.

Cook's Falls consisted at the bottom of soft dark shale which may belong to the *Obolus* but more probably in my *Randallville*. From the base and for about 180' the rock is a barren nearly sandy shale, abounding at the top in *L. flava*. This grades gradually into the Centerfield which consists of about 30' of hard sandy rock, difficult to collect because exposed mostly as cliff faces. This is succeeded by 52' of rock, soft, sandy and very fossiliferous at the bottom, becoming sandy at the top and forming a falls a short distance above the bridge. This is succeeded by the coral reef (same as at Fellows Falls) and this by 8' of shale and sandy shale forming a falls at the second old mill and dam. The creek was followed no farther upstream as it flattened here considerably.

